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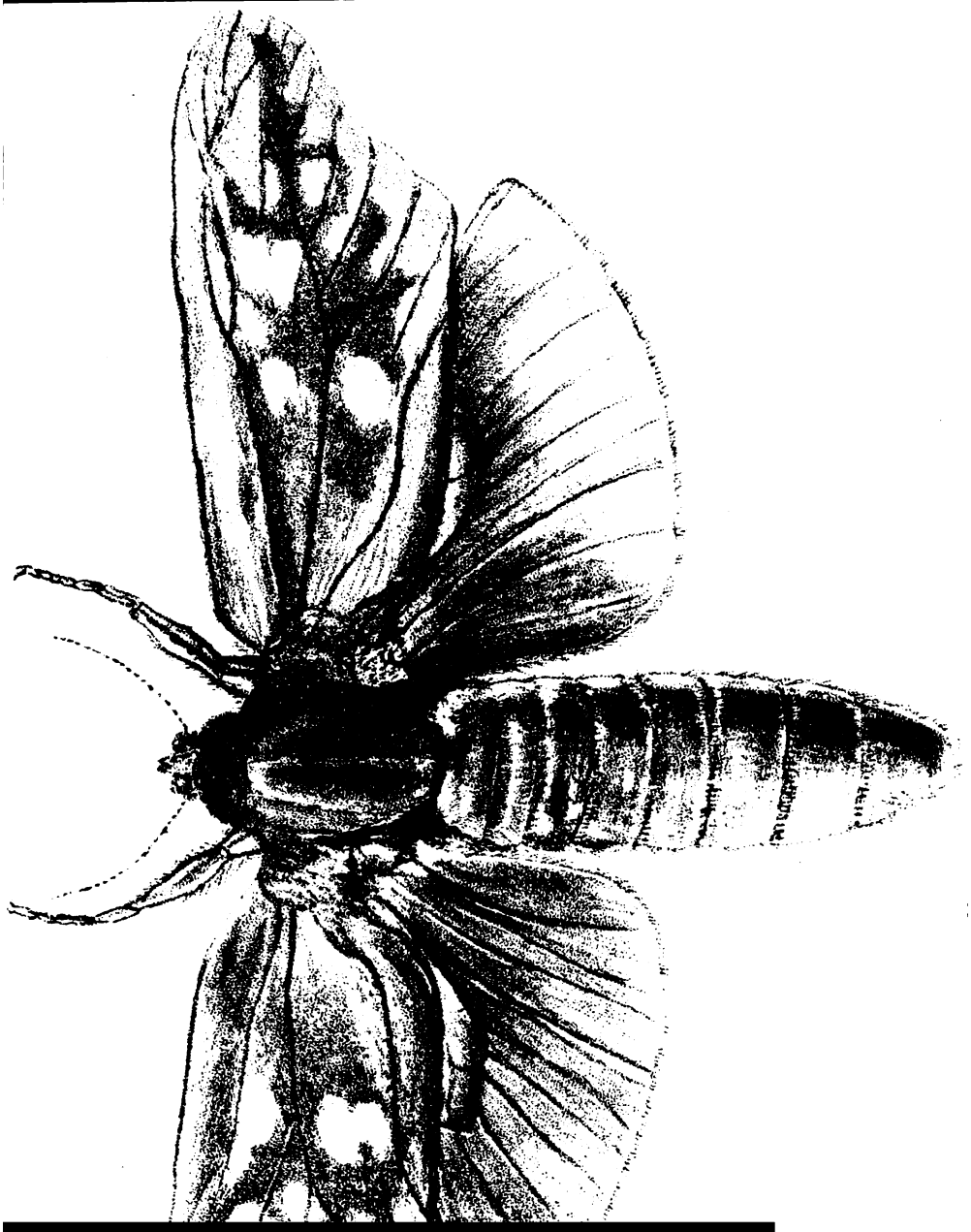

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AND

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OF THE

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For 1890-91.

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A Grammar and Vocabulary of the Language spoken by the Aborigines of the MacDonnell Ranges, South Australia.

By the Rev. H. Kempe, of the Mission Station, River Finke, Corr. Memb.

[Read December 2, 1890.]

PREFACE.

The result of an attempt to analyse a language of which the people speaking it have only a colloquial knowledge, and who are consequently incapable of answering or even understanding grammatical questions, must be in many respects imperfect. The difficulty is increased by the wandering habits of the people, making it impossible to maintain that constant communication with them which is necessary for the attainment of a complete knowledge of the structure of their language. It is only with the help of the boys grown up on the station, and who have become less nomadic than their elders, that the knowledge now gained has been established. There still remain mysterious phrases, incapable as yet of being traced back to their origin, awaiting solution. The following pages, therefore, do not profess to contain a complete vocabulary, nor one which would satisfy the learned philologist. Even up to the present day expressions crop up for things it was thought the natives had no words. The difficulty is increased by the close proximity of another tribe, for south of the Finke the natives speak a different language altogether, as their words terminate in *i* and *u* and *au*, whilst the others terminate all in *a*. As they have frequent intercourse with each other, it is very easy to understand that the natives to the north must have adopted many of the words and phrases of those to the south.

Concerning the vocabulary, it may be mentioned that it has been carefully compiled and revised several times with different natives, so that the words may be relied upon as correct.

These pages are submitted in the hope that they will prove interesting to the philologist, as exhibiting the peculiar structure of the language spoken by a people generally considered among the lowest in the scale of mankind, and will contribute a little towards perpetuating the knowledge of a language of one of the Australian tribes of natives before their probable entire extinction at a no very remote period.

The vocabulary is that of the tribe inhabiting the River Finke,

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and is also, with only slight variations in the dialect, that of the tribes in the MacDonnell Ranges eastward to Alice Springs, but not far westward of the River Finke, and extending southward to the Peake.

GRAMMAR.

CHAPTER I.

Of the Characters taken to Represent the Sounds of the Language, and their Pronunciation.

VOWELS.

A a, like a in father, are
E e, like e in there, were
I i, like i in tin
O o, like o in more
U u, like u in dull, or o in more.

DIPHTHONGS.

Ai ai, like i in light
Au au, like ow in now
Oi oi, like oi in oil.

CONSONANTS.

B b, like b in be
D d, like d in do
G g, like g in go
H h, like h in here
J j, like y in year
K k, like k in king
L l, like l in long
M m, like m in more
N n, like n in near
Ng ng, like ng in ring
P p, like p in pipe
R r, like r in roam
T t, like t in to
Tj tj, like g in gentle
W w, like w in wife

These are the primitive sounds, to which for the sake of the pronunciation of the Scriptural names, were added—

F f, like f in far
S s, like s in so
Z z, like z in zero.

The vowels and diphthongs are to be considered as always short. In order to make the number of written characters as few as possible, the elongation of the syllable is indicated by a small stroke over the letter, as, lāda, "the paint," in which the a is to be pronounced long, as in far.

When two or three vowels occur, they form a dipthong; if not, they are separated by the mark of diœresis (··), as, leoïka.

CHAPTER II.

Of Substantives and their Cases, and of Prepositions.

Substantives have three numbers: singular, dual, and plural, but no distinctive mark for gender either by the use of an article or otherwise. There is no article

All words terminate in *a*, with the exception of the vocative of substantives, and the imperative mood of verbs which terminate in *ai*.

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The dual is formed by adding the termination *ntatera* to the word, as, *atua*, "the man," *atuantatera*, "the two men."

Besides this there is a particular form of dual, which is only used personally by annexing the particle *nanga*, as, *wora*, "the boy; *worananga*, "the two boys;" *kwara*, "the girl;" *kwaranaṅga*, "the two girls."

The plural is formed by adding *irbera* or *antirbera*, as, *aragutja*, "the woman," *aragutjirbera* or *aragutjantirbera*, "the women."

This form cannot be used in the neuter gender, but the form *ntatera* can also be used personally.

There are six cases—nominative, genitive, dative, accusative, ablative, and vocative.

a. The nominative is expressed in a double manner. The word is unchanged, if connected with an intransitive verb, as, *atua indama*, "the man sleeps," or *katjia lima*, "the child goes;" but it is formed by adding the particle "*la*," when it is unconnected with a transitive verb, as, *worala gama*, "the boy cuts," &c., or *apmala utnuma*," &c., "the snake bites," &c.

b. The genitive is formed by adding *ka*, as *kataka*, "of the father." By the genitive is expressed either possession, as, *wora kataka*, "the son *of the* father;" or it shows to whose advantage or disadvantage anything is done, as, *ta irbunga inaka kniribata ka*, "I fishes caught old man for," *i.e.*, "I caught fishes *for* the old man." It also expresses the purpose of any action, as, *aragutja inkuka laka*, "the woman went *for* bullrushes," *i.e.*, to fetch bullrushes.

c. The dative terminates in *na*, as, *ata katjiana ntema*, "I give *to the child.*"

d. The accusative is always unaltered, as, *ta kwatja njuma*, "I drink *water.*"

e. The ablative terminates in "*nga*," and shows the direction whence a thing comes, as *ta kwatja nanjinga inama*, "I fetch water *from the well;*" or it signifies the material from which a thing is made, as *era ulbaïnja ititjinga erbuma*, "he a boomerang of mulga makes;" or it signifies the cause for which a thing is done, as *jinga woringa tarama*, "I laugh *for the sake of the boy.*"

f. The vocative terminates in *ai*, as, *katjiai*, "child!"

The declension of the substantive may be seen by the following table:—

Singular.

Nom.	atua, or atula, the man.
Gen.	atuka, of the man.
Dat.	atuana, to the man.
Accus.	atua, the man.
Abl.	atuanga, from, for the man.
Voc.	atuai! man!

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Dual (Personal).

Nom.	atuananga, the two men.
Gen.	atuanangaka, of the two men.
Dat.	atuanangana, to the two men.
Accus.	atuananga, the two men.
Abl.	atuananganga, from the two men.
Voc.	atuanangai ! you two men !

Dual (Neuter).

Nom.	lunjantatera, the two huts.
Gen.	lunjantateraka, of the two huts.
Dat.	lunjantaterana, to the two huts.
Accus.	lunjantatera, the two huts.
Abl.	lunjantateranga, from the two huts.

Plural.

Nom.	atuirbera or antuantirbera, the men.
Gen.	atuirberaka or antuantirberaka, of the men.
Dat.	atuirberana or antuantirberana, to the men.
Accus.	atuirbera or antuantirbera, the men.
Abl.	atuirberanga or antuantirberanga, from the men.

Other substantives are formed—

(a.) by adding to primitive substantives the particle "*ringa*," signifying something pertaining or belonging to a certain thing or place, as, *arila*, "sand;" *arilaringa*, "a man belonging to or being at home in a sandy country;" or *aputa*, "hills or ranges;" *aputaringa*, "men whose home is in the ranges." This particle is also affixed to names of places, and expresses the place at which one is at home, as *mbarata*, "a place;" *mbarataringa*, "men who are at home at *mbarata*."

(b.) Out of the roots of verbs, as, *gama*, "to cut;" *ganangana*, "a cutting thing, *i.e.*, a knife;" *indama*, "to sleep;" *indanindana*, "a sleeping thing, *i.e.*, a bed;" *tuma*, "to beat;" *tunatuna*, "a man beating, *i.e.*, a beater;" *ntema*, "to give;" *ntenantena*, "a giving man, *i.e.*, a giver."

OF PREPOSITIONS.

There are two classes of prepositions, one class consisting of separate words and the other consisting only of small particles, annexed to the substantives, to which they belong as suffixed. As the prepositions, consisting of separate words, are placed at the end of the word to which they belong, they should be rather called *postpositions*. The majority always govern a certain case.

a. Those taking the ablative case are nine in number, viz. :—

1. *ulara*, "in front," as,

era atunga ulara tnama.

"he of man in front stands."

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Ulara also governs the genitive case when used in the sense of "against" either friendly or hostile, as,

era tjinakatjina nukanaka ulara nama,
"he friendly me against is,"
i.e., "He is friendly towards me."

II. *topala*, "behind," as,
era woranga topala nama,
"he boy behind is,"
i.e., "He is behind the boy."

III. *gatala*, "outside," as,
katjia iltanga gatala nama,
"child from house outside is,"
i.e., "He is outside the house."

IV. *mbobula*, "between," as,
kwara worateranga mbobula tnama,
"girl boys two between stands,"
i.e., "the girl stands between two boys."

V. *ntuara*, "other side" (Latin, *trans*), as,
erila ulbaïinga ntuara lima,
"man river otherside goes,"
i.e., "the man goes on the other side of the river."

VI. *nunkara*, "this side" (Latin, *citra*), as,
ilta nuka ulbaïinga nunkara tnama,
"house my river this side stands."
i.e., "my house stands on this side of the river."

VII. *nkelala*, "beside" (Latin, *juxta*), as,
era nkelala katunga nama,
"he besides father sits."
i.e., "he sits besides the father."

VIII. *itinjawara*, "close by," as,
iltanga itinjawara,
"from house close by."
i.e., "close by the house."

IX. *ntuarintjirka*, "through," as,
nana ta altjuranga ntuarintjirka iwuma,
"this I hole through throw."
i.e., "I throw this through the hole."

b. Those with accusative case are four in number, viz. :—

I. *katningala*, "upon," as,
jinga aputala katningala tnama,
"I hill upon stand."

II. *katningalagana*, "over," as,
ngapa bira katningalagana ilbanama,
"crow tree over flies."
i.e., "the crow flies over the tree."

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III. *kwanakala*, "down," as,
jinga aputa kwanakala luluma,
"I hill down climb."
i.e., "I climb down the hill."

IV. *kwanala*, "inside," as,
katjia iltakwanala nama,
"child house inside is."

c. Prepositions annexed to nouns as suffixes are nine, viz. :—

I. *una*, "on, upon, into," as, *kwatjuna*, "to the water;" *biruna*, "upon the tree;" *nanjuna*, "into the well."

II. *lela*, signifies the instrument with which or the person by whom anything is made or accompanied, as, *ilupalela*, "with the axe;" *erilalela*, "by the man;" *jinga erinalela lama*, "I go with him."

III. *la*, signifies the place where anyone is, as, *aputala*, "on the hill;" it is therefore annexed to all names of places, as, *tjoritjala*, "at Alice Springs;" *tungala*, "at Henbury."

IV. *gata*, "with" (Latin, *cum*), as,
atua tjatagata bitjima,
"the man spear with comes."

V. *raba*, "without," as,
era gararaba albuma,
"he meat without goes back."
i.e., "he goes back without meat"

VI. *gitjala*, "for, in exchange," as,
ta maṅa ntitjinanga irbungagitjala,
"I bread will give fishes for."
i.e., "I shall give bread for fishes."

VII. *kaguia*, "for the sake of," as,
unkwangakaguia ta tarama,
"your sake for I laugh."
i.e., "I laugh for the sake of you."

VIII. *kieka*, "on, to," as,
ta ipepa iltakieka kantatuma,
"I paper house on nail."
i.e., "I nail the paper on the house."
or, *erinakieka ta kumilaka*,
"him on I have sinned."
i.e., "on him I have sinned."
or, *nilknambakieka ta ngana numerilama*
"thief to I you count."
i.e., "I count you a thief."

IX. *ibera*, *ibena*, "from, out of," as,
iltibera, "out of the house;"
kwatjibena, "from the water."

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CHAPTER III.

Of Adjectives and their Degrees of Comparison; of Numbers.

ADJECTIVES.

Adjectives may receive the same particle as the noun, to which they belong; the particle is generally omitted in one of the words, the substantive as a rule, for only the last word is declined, as,

ta katjia tera marana mana ntema,
"I child two good to bread give."
i.e., "I give bread to the two good children."

Besides these primitive adjectives, others are formed—

a. From substantives, by annexing the particle *karinga*, as, *kwatja*, "water;" *kwatjakaringa*, "watery;" or, *arila*, "sand;" *arilakaringa*, "sandy;" or the particle *buta*, as, *puta*, "stone;" *putabuta*, "stony;" or the particle *mata*, as, *kankinja*, "love;" *kankinjamata*, "loving;" *njirkna*, "hate;" *njirknamata*, "spiteful;" *kata*, "father;" *katamata*, "fatherly."

b. From the roots of verbs by adding the particle *ntjalkua*, as, *tnima*, "weep;" *tnintjalkua*, "disposed to cry;" *ankama*, "speak;" *ankantjalkua*, "talkative."

Of the degrees of comparison—

a. Comparative of equality:

nana tera mala knira naramanga,
"these two equal large are."

b. Comparative of superiority is formed by adding the particle *alkura*, as,

nana wora maralkura nama, nana ngetjina,
"this boy good more is, that than."
i.e., "this boy is better than that."

c. The superlative can only be expressed either by repetition of the word, as, *kunakuna*, "very bad;" or by adding the word, *indora*, "very," to an adjective, as, *tjenja*, "high;" *tjenjindora*, "very high."

d. Diminutives are formed by adding the particle *kotjirka* to the word, as, *putakotjirka*, "a very small stone;" *kurkakotjirka*, "a very small one."

NUMBERS.

There are primitively only numbers up to four, viz.:—*ninta*, "one;" *tera*, "two;" *teramininta*, "two by one," *i.e.*, "three;" *teramatera*, "two by two," *i.e.*, "four."

These numbers are declined in the same way as nouns when standing in place of one.

All higher numbers are expressed by:—*urbutja*, "some;"

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arinabula, or *arungalura*, "a few;" *njara*, "many;" *njaraknira*, "very much."

CHAPTER IV.

Of Pronouns.

POSSESSIVE PRONOUNS.

The possessive pronouns are the only class of pronouns whose declension is perfect (all others are more or less defective as regards declension). They must therefore be taken first as in many instances they supply the deficiencies of other pronouns. All pronouns, if declinable, are with only slight alterations declined as substantives, as the following table, giving the declensions of the possessive pronouns, shows :—

Singular.

First Person.

Nom.	katjia nuka, my child.
Gen.	katjia nukanaka, of my child.
Dat.	katjia nukana, to my child.
Accus.	katjia nuka, my child.
Abl.	katjia nukananga, from my child

Second Person.

Nom.	kwara unkwanga, thy girl.
Gen.	kwara unkwanganaka, of thy girl.
Dat.	kwara unkwangana, to thy girl.
Accus.	kwara unkwanga, thy girl.
Abl.	kwara unkwanganga, from thy girl.

Third Person.

Nom.	kata ekura, his, her, its father.
Gen.	kata ekuranaka, of his father.
Dat.	kata ekurana, to his father.
Accus.	kata ekura, his father.
Abl.	kata ekurananga, from his father.

Dual.

First Person

Nom.	maia ilinaka, the mother of us two.
Gen.	maia ilinakanaka, of the mother of us two.
Dat.	maia ilinakana, to the mother of us two.
Accus.	maia ilinaka, the mother of us two.
Abl.	maia ilinakananga, from the mother of us two.

Second Person.

Nom.	kalja mbalaka, the elder brother of you two.
Gen.	kalja mbalakanaka, of the elder brother of you two.
Dat.	kalja mbalakana, to the elder brother of you two.
Accus.	kalja mbalaka, the elder brother of you two.
Abl.	kalja mbalakanaka, from the elder brother of you two.

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The third person dual, *ekuratera*, "their two," and all persons of plural, as, *anunaka*, "ours;" *araganka*, "yours;" and *etnika*, "theirs;" are treated exactly like those above.

Besides these there are other possessive pronouns, which have both a reflective and a reciprocal sense, acting however as possessive pronouns as well; in this case their meaning is, pertaining or belonging to any person.

They are only used in the nominative case, and are undeclinable.

nukara,	mine.
unkwangara,	thine.
ekurara,	his, hers, it.
ilinakara,	our two.
mbalakara,	your two.
ekuraratera,	their two.
anunakara,	ours.
aragankara,	yours.
etnikara,	theirs.

The following double forms have the same meanings:—*nukiltja* and *nukaringa*, "mine;" *unkwangiltja* and *unkwangaringa*, "thine," &c., but these two are like the first-named, regularly declined.

Nearly all pronouns may be connected with all specified prepositions in Chapter II—*katjia nukanauna*, "to my child;" *katjia nukalela*, "with or by my child," &c.

PERSONAL PRONOUNS.

a. First Person Singular.—There are two pronouns for "I," *i.e.*, *ata* or, the first *a* being dropped, *ta*. This is always used when connected with a transitive verb, as, *ta tuma*, "I beat," *ta ilkuma*, "I eat;" whereas connected with an intransitive verb, there is used *jinga*, as *jinga lima*, "I go," or *jinga indama*, "I sleep;" *ta* is indeclinable, but when, for instance, they say, "God gives me life," where give is a transitive verb, they use *jinga*, and say,

Altjirala jingana etata ntema.
"God to me life gives."

But supposing they say, "he died for me instead of me," this is expressed by the possessive pronoun *nuka*, as, *era nukanga iluka*, "he for me died," because *jinga* is only used in the nominative and dative cases.

b. Second person, *unta*, "thou, you." This stands also only in nominative case; where necessary they take for declension the possessive pronoun *unkwanga*, "thy." This is sometimes in genitive and dative cases abbreviated, viz.,

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unkanganaka to ngaka,
unkwangana to ngana,
unkwanganga to nganga, as,
ta nana ngana ntema,
"I this you to give,"
i.e., "I give this to you."

c. The third persons singular, dual, and plural are regularly declined, like possessive pronouns. List of personal pronouns:—

ta or jinga,	I	eratera,	they two.
unta,	thou	anuna,	we.
era,	he, she, it	arankara,	you.
ilina,	we two	etna,	they.
mbala,	you two		

In connection with these is also used the suffix, *arpa*, "self," by annexing it to the personal pronouns, *ta*, *unta*, *era*, &c.,

ta arpa, contracted tarpa, I, myself,
unta arpa, contracted untarpa, thou, thyself,
era arpa, contracted erarpa, he, himself,

and the others the same. This form is also used in the sense of "not ordered," "not compelled," as,

ta erina ntankatjimakana, erarpa bitjima,
"I him called have not, he self comes,"

i.e., "I have not called him; he comes himself." Another form of emphatic sense is *utara* in singular, as,

unta kala rula tukala, tautara tuiai,
"you enough wood have cut, I shall cut,"

i.e., "you have cut wood enough; I shall cut." This is altered in dual and plural to *watera*, as, *ilinawatera, mbalawatera.*

Besides those above-mentioned, there are the following Reflective and Reciprocal Pronouns, viz.:—*nukara*, mine, *unkwangara*, "thy," &c.

Ex. reflective. *ta nukara tulama,*
"I myself beat."

Ex. reciprocal. *etnikara turirama,*
"they beat each other."

The only sign whether a pronoun is reflective or reciprocal is shown in the form of the verb—*vide* Chapter VIII.

There are only two Demonstrative Pronouns—

nana,	this.
nanatera,	these two.
nanirbera, nanankana	these.
tana,	that.
tanatera,	those two.
tanirbera, tanankana	those.

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Instead of *tana* is also used, *nakuna* and *arina*, "that."
Declined in the same manner as possessive pronouns.

There are also only two Interrogative Pronouns.

nguna, "who?" and *iwuna*, "what?"

Dual and plural formed like those in the demonstrative pronouns.

The only difference in the declension of these two is that the terminations of genitive, dative, and ablative cases, dual and plural, are inserted between the root and termination of the word, as—

Dual.

Gen.	ngukatera?	of which two?
Dat.	ngunanatera?	to which two?
Abl.	ngunangatera?	from which two?

Plural.

Gen.	ngukirbera? ngukankana?	of which?
Dat.	ngunanirbera? ngunanankana?	to which?
Abl.	ngunangirbea? ngunanganka na?	from which?

The correct answer to the question, *ngula nana nilknalinaka?*
"who this stolen has?"
must be, *katjiala nana nilknalinaka*,
"the child this stolen has;"
not *katjia*, because steal is a transitive verb.

The questions, *nguna unta nama?* "who are you?", *nouna nana nama?* "what is that?", or *nana, iwuna, ntitja?* "this, what is it?", are answered, *jinga nama*, "I am;" and *nana, tana ntitja*, "this, that is it."

RELATIVE AND INDEFINITE PRONOUNS.

a. There are no Relative Pronouns in the language; they are expressed either by repetition of the demonstrative pronouns, *nana* and *tana*, as,

atua nala, nana tmurka albuka, worana tukala,
"man this, this yesterday went away, the boy has beaten,"
i.e., "the man who went away yesterday has beaten the boy;"
or else by the participle of verb corresponding with the English participle, as,

ilupa tera, iltala mbakatnarakala, jiraka,
"axes two, on house were leaning, disappeared."
i.e., the two axes, which were leaning on the house, disappeared."

b. The Indefinite Pronouns are the following:—

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arbuna and tueda,	another.
arbunatera,	two others.
arbunirbera and arbunankana,	others.
urbutjarbuna,	some others.
nkarba,	a few others.
tuedakatueda,	others.
nintamintnta,	one by one, each.

The declension of these is regular.

There are three pairs of Correlative Pronouns, used only in the nominative case:—

ntakina?	how, or in what way?
lakina,	thus, this way.
ntakinja?	how many?
lakinja,	so many.
ntakata?	how big?
nakakata,	so big.

CHAPTER V.

Of Adverbs, of Conjunctions and Interjections.

Derived adverbs, corresponding with English adverbs in "ly," are formed by adding the particle "la" to adjectives, as *era ekaltala erguma*, "he holds fast."

Others are—

a. ADVERBS OF TIME.

lata,	now.
lilika,	soon.
tmurka,	yesterday.
tmurkarbuna,	the day before yesterday.
ingunta,	to-morrow.
imanka,	long ago.
anma,	by and by.
ilangara?	what time?
kuta,	always.

Others will be found in the vocabulary.

b. OF PLACE.

nana,	here.
itinja,	near.
longa,	far.
ntala?	where?
ntauma?	whither?
ntananga?	whence?
nauna, arinuna,	thither.
arina,	there.

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c. OF NUMBER.

ninta ranga, ninta ngara } once.
ntakinjaranga? how many times?
tera ranga, twice.
urbutja ranga, sometimes.

d. OF ORDER.

arugula, the first.
mbola, between.
inkana, the last.

e. OF QUANTITY.

njara, much.
kala, enough.
kurka, a little.
lakina, so.
ngera, like.
wota, more.

f. OF QUALITY.

monjala, slowly.
kuna, badly.
parpa, quickly.
mara, good.

g. OF AFFIRMATION.

tutna, certain, true.
wakuia, of course.
wa, wabala, } yes.

h. OF NEGATION.

itja, no, none.
gunia and lira, none.

CONJUNCTIONS.

This language possesses very few conjunctions. The majority are combined with the verb. There is not even a proper word for the copula, and the following are the only ones found :—

tuta, urungara, } too, also.
etalinja, yet.
bula, but.
wara, only.
ngetjina, as, than.
gurunga, then.
nta (suffix), only.

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INTERJECTIONS.

aai !	"hear!"
apu !	"I am sorry."
erai !	"behold!"
tjikai !	"Ah!" calling attention.
tjikabai !	"woe."
nturbai !	"indeed, it is true."

CHAPTER VI.

OF TENSES, VOICES, NUMBER, AND MOODS OF VERBS.

There are three tenses. The present tense is indicated by the termination "*ma*" added to the root of the verb, as, *tuma*, "to beat." *Tu* is the root of the verb, but *ma* is the termination.

This also represents the Infinitive of the verb, there being no other form to indicate it, so that the meaning is, "I do beat," or "I beat."

The perfect tense is formed by adding the particle *ka*, or *kala* to the root of the verb, as, *tuka*, or *tukala*, "I have beaten." The first probably corresponds to the Imperfect and the latter to the Perfect, though the natives themselves cannot explain the difference.

There is still another form for the perfect tense, viz., *tjita*, as, *tutjita*, "I have beaten," which is very likely the Preterite, though it is difficult to determine the difference, as they have very little notion of time, and use often for remote time both forms, *ilkukala* and *ilkutjita*, which both mean "I have eaten," but leaves it undecided whether yesterday or a long time ago.

The future tense is formed by adding *tjina* to the root of the verb, as, *tutjina*, "I shall beat;" or, *ilkutjina*, "I shall eat."

OF VOICES.

The Active Voice signifies always an action executed by a subject, but this may be:—

a. Intransitive when it signifies an action remaining with the subject, as, *antata alknanbuma*, "the flower blooms;" or, *era lima*, "he goes."

b. Transitive when it signifies that the action is or may be transferred to an object in the accusative case, as, *ta kwatja njuma*, "I drink water;" or, *ta wora tukala*, "I have beaten the boy."

The Middle Voice signifies an action which the subject executes directly upon himself, as, *ta nukara tulama*, "I beat myself;" *ta nukara tulaka*, "I have beaten myself;" *ta nukara tulitjina*, "I shall beat myself." As will be seen, the sign of the middle voice form is inserted in the middle of the verb, consisting of the particle *la* or *li*.

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The reciprocal form, which, of course, can only be with dual and plural, is known by the termination *rama* for dual and *rirama* for plural, as, *ilina turama*, "we two beat each other;" *anuna turirama*, "we beat each other."

A proper form for the Passive Voice does not exist, and it is expressed by putting the subject in active form and the object in the dative case, as,

atula worana tukala,
"by the man to the boy is beaten."
i.e., "the boy is beaten by the man."

OF NUMBER.

There are, as with nouns and pronouns, three numbers, *i.e.*, singular, dual, and plural. These can be distinguished by the termination of the verb, if unconnected with a pronoun. The pronoun being used the plural form of the verb may be omitted, as not being necessary to a clear understanding. There is no inflection on account of gender or persons, the latter being expressed by the pronoun. The termination of the dual of intransitive verbs is *rama*, of plural *rirama*; as, *jinga lama*, "I go;" *ilina larama*, "we two go;" *anuna lararama*, "we go." With transitive verbs the dual and plural are formed by using the intransitive verbs, *nama*, "to be;" and *lama*, "to go;" as auxillary verbs, as, *ta ilguma*, "I eat;" *ilina ilgula narama*, "we two eat;" *etna ilgula narirama*, or *etna ilgulta nama*, "we eat." The two expressions signify the same; but the latter is very likely a form of participle, so that the meaning would be "we are eating." It will be seen by this that the only difference is in using the participle, *la*, added to the root of the main verb.

The dual and plural in the Middle voice double the particle, *la*, as, *ilinakara tulala narama*, "we two beat ourselves;" *anunakara tulala narirama*, "we beat ourselves."

OF THE MOODS OF VERBS.

There are three chief moods—Indicative, Conditional, and Imperative. The form of the Indicative has been given already. The Conditional is formed by adding the termination, "*mara*," to the root, as *ta ilkumara*, "I should eat."

The Imperative is formed by the particle, *ai*, added to the root, as, *tuai!* "beat;" *ilgula narai!* "you two eat!" *ilgula narirai!* "eat you!"

Another form, signifying an order to do it quickly, is composed of the repetition of the root of the verb and the insertion of the particle, "*lba*," as *tulbatuai!* "beat quickly!"

Also belonging to the Imperative may be reckoned the following form:—

ta tuiai! "let me beat!"
anuna ilkula narirsai! "let us eat!"

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These chief moods, as well as the accessory ones, have almost all a double form—one for a positive and one for a negative sense—as,

Positive.	Negative.
ta tumá, I beat.	ta tutjikana, I beat not.
ta njuka, I drunk.	ta njutjimakana, I have not drunk.
ta gatjina, I shall cut.	ta gatjigunia, I shall not cut.

The other accessory moods are—I. The Participle, meaning doing, as doing, while doing, &c., formed by the particles: "*manga*," for present, "*mala*," for perfect, and "*tjinanga*," for future tense, as,

tumanga, while beating.
tumala, after beating.
tutjinanga, shall be beating.

II. The Supine is formed by the particle, *tjika*, as,

ta tutjika, to beat, or I must beat.
ta tutjika bitjima, I came to beat.
negative, ta tutjika nitjika,
I to beat must not, *i.e.*, I must not beat.

There is another similar form, difficult to designate, formed by the particle, "*mitja* or *kutja*," added to the root of verbs, as, *tumitja* or *tukutja*, probably an abbreviation of *tuma* and *itja*, "not," and of *tuka* and *itja*. The meaning of it is,

lai! ta ngana tumitja,
go! I you not beat!
i.e., go, that I do not beat you!

Connected with the participle perfect is another form, *tumal katana*, meaning seeming to be so, as,

Alinga airima limalakatana,
"Sun sees, going as if,"
i.e., "the sun seems as if he were going;" or,
Parpala limanga bira limalakatana,
"quickly when going, tree seem to go,"
i.e., "When quickly going, the trees seem to go."

CHAPTER VII.

Of Auxiliary Verbs.

Pure auxiliary verbs, as, to *be*, to *have*, *may*, *can*, &c., are not used as such, for the verbs in use for auxiliary verbs are not treated in the same way as in English. They act as absolute verbs as well; for example, *nama*, "to be," means also "to sit down."

There are only two used as auxiliary verbs proper: *nama*, "to be;" and *lama*, "to go."

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In addition to these, there is a class of verbs used for different purposes, and in various manners.

I. To make out of intransitive verbs transitive ones, as, *kumerama*, "to arise or awake," is intransitive, but by omitting *erama*, and instead of this adding *lilama*, *kumililama* is formed, and it becomes transitive, with the meaning, "to wake or call up;" or again, *ntankama*, "to call," by adding the verb *lelama*, "to promise," it becomes a transitive verb, meaning "to save, to redeem."

II. To form verbs from substantives and adjectives, as, *inguia*, "old," by adding to this *erama*, "to see," it becomes an intransitive verb, "getting or becoming old" *(inguierama)*, though *erama* is originally a transitive verb; or to *atua*, "man," add *erama*, it becomes *atuerama*, "becoming a man;" or *tjeba*, "a piece," to this add *gama*, "to cut," thus, *tjebagama*, "to cut in pieces, to tear," &c. In similar ways are also used *wuma*, "to hear;" *ilama*, "to say;" *ankama*, "to speak;" *albuma*, "to go back;" *arinama*, "to put;" *ntema*, "to give;" *indama*, "to sleep;" *anbuma*, "to touch;" and many others.

Before passing to the original or main verb, a table showing the conjugation of an auxiliary verb will be given in full, as it occurs so frequently. The present tense is given in full, but further on only the first person of each number is taken.

See Table I., Appendix.

In the same way are treated all intransitive verbs.

CHAPTER VIII.

Of Transitive Verbs and their Conjugation.

The conjugation of the transitive verb is easy to comprehend, as it needs only the proper pronoun to be put in its proper place. Instead of further explanation it will be best to give a table showing the conjugation of the transitive verb *tuma*, "to beat," because it takes all tenses, moods, and voices, whilst others are more or less defective.

As will be seen by Table II., Appendix, only the first person has been given showing the conjugation of the reciprocal form. This is sufficient as the others are regular.

Where the negative conjunction *gunia* (meaning "no" or "none") occurs, there is no particular form used; neither is there one for the Participle future negative, the future of the Indicative negative being employed—*vide* Table I., Appendix. This is only the case with the regular conjugation of the simple verb. There are, however, an almost endless number of secondary notions connected and combined with the verb, which it is difficult to designate by any term. The natives combine almost everything

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with the verb, which in English are expressed by adverbs of place, of time, of quality, of quantity, &c.

These combinations make the use of the verb a sort of labyrinth, through which it is a difficult task to follow or keep the clue. The following chapters will be devoted to putting these into classes, so as to render the subject as simple as possible.

CHAPTER IX.

Verbs Combined with the form "Tula."

This form "tula" is used with the conjugation of the absolute verb in the active as well as in the middle voice, but whether as a kind of supine or not, it is always used as a main verb.

The other forms combined with this form act as auxiliary verbs, and most of them are treated as in Table I., Appendix. They are the following:—*uma* or *wuma*, "to hear;" *nama*, "to be;" *lama*, "to go;" *albuma*, to return;" *ngama*, "to carry."

Then there are several others where only the form *tula* is either altered or elongated; these cannot be considered combined verbs, although they are contracted with particles or fragments of other words.

For the sake of a more distinct arrangement both will be considered in different paragraphs.

VERBS COMBINED WITH "TULA."

I. *Tula nama*, "to beat for a certain time constantly," which is expressed by the auxiliary verb *nama*, "to be" or "sit down;" so that the meaning of it is "I beat constantly or continually."

This verb is conjugated in all the moods and voices of Table I., Appendix, except Middle and Reciprocal, which adopt the conjugation of the absolute verb *tuma*, "to beat."

II. *Tula lama;* the literal translation is, "I go to beat," and it signifies an action in which the subject is in course of executing and has not yet finished, similar to the present participle. This verb can also be treated as I. As, however, the auxiliary verb *lama* cannot have a reciprocal form, the termination of this must be added or rather inserted for reciprocal meanings, as, *anunakara turirala lama*, "we are beating each other;" *anunakara turirala litjina*, "we shall beat each other," &c.

III. *Tula tula lama;* a reduplication of the former verb, and therefore meaning "to beat sometimes quickly or hastily." Treatment, the same as the foregoing.

IV. *Tula uma;* the literal translation would be, "I hear to beat," but the usual meaning is, "I beat once." This verb also takes all moods and voices of Table II., Appendix. The conjugation of these verbs can easily be formed, for the main verb, here *tula*, remains unchanged, and after omitting the termination *ma*

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of the secondary verb, *uma* or *wuma*, the terminations of the moods and voices are added to the root of the secondary verb, as shown in Table I., Appendix. Only two slight alterations exist, one in the reciprocal form, which runs thus, *ilinakara turala wurama*, "we two beat each other once;" *anunakara turala wurirama*, "we beat each other once;" and the other with the future positive as well as negative, where the form is not *tula utji gunia*, but *ta tulaunja gunia*, "I shall not beat once;" *ilina tula wurinja gunia*, "we two shall not beat once," &c.

Middle Voice: *nukara tulaunja gunia*, "I shall not beat myself once;" *ilinakara tula wuririnja gunia*, "we two shall not beat ourselves once."

Reciprocal: *anunakara turala wuririnja gunia*, "we shall not beat each other once."

v. *Tula albuma* or *tulalbuma*, meaning, "arrived at another place beating," or "arrived I beat." Conjugation similar to IV.

VERBS COMBINED WITH OTHER VERBS OR FRAGMENTS OF VERBS.

I. *Tulienama*: a peculiar form used before a following Supine, as, *ta tulienaka, erina ilutjika*, "I have beaten, that he died."

Active Voice: *Ta tulienama*, "I beat;" *ilina tuliela narama*, "we two beat;" *anuna tuliela narirama*, "we beat."

Middle Voice: *nukara tulalienama*, "I beat myself;" *ilinakara tulaliela narama*, "we two beat ourselves;" *anunakara tulaliela narirama*, "we beat ourselves."

Reciprocal: *ilinakara turalienama*, "we two beat each other."

Other forms obtained by annexing the terminations of Table II., Appendix.

II. *Tulabuma*, "beating by walking about." The complete form for "to walk about" is *bala nama*; hence *tulabuma* is only an abbreviation of *tula* and *bala nama*. These abbreviations are very common in this language, and make it difficult to understand the real meaning of a phrase where this and other similar abbreviations are used. The conjugation is the same as in Table I. Appendix, for *buma* acts as an auxiliary verb.

III. *Tulinja ngama*, meaning, "to beat always."

Conjugation as in Table I., Appendix.

The termination of Middle and Reciprocal Voices are inserted in or rather added to *tula*, as,

Middle: *nukara tulalinja ngama*, "I beat myself always;" *ilinakara tulalinja ngarama*, "we two beat ourselves always."

Reciprocal: *ilinakara turalinja ngama*, "we two beat each other always;" *anunakara turiralinja ngama*, "we beat each other always."

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CHAPTER X.

Forms of Verbs Combined with the Supine.

In some of these combinations the Supine is easily distinguished, whereas in others it is abbreviated, the meaning showing its existence nevertheless. Again, it is sometimes combined with a simple verb, whilst in other cases it contains other particles. The literal translation is not in many cases absolutely correct, but still sufficiently so to lead to a right interpretation.

As there are only a few of these forms they will be considered *seriatim.*

I. *Tutjikalama*, evidently consisting of the Supine, *tutjika*, and the auxiliary verb, *lama*, "to go," literal translation would be "I go to beat," but the usual meaning is "I beat from above to beneath"—*i.e.*, downward.

II. *Tutjinjama*, where the termination *ka* of the Supine is omitted, and also the secondary verb is abbreviated from *intitjinjama* into *injama*, "to rise or ascend." The meaning of it is "I beat from beneath to above or upwards." However, this meaning is often altered in other verbs, as, for instance, *ilkuma*, "to eat," where *ilkutjikalama* means "to eat in the evening, to sup," and *ilkutjinjama* means "to eat in the morning, to breakfast." The conjugation of both is the same as shown in Table I., Appendix; and the Middle and Reciprocal forms are treated as *tulinja ngama* (see chapter ix.)

III. *Tutjika ma nitjikana*, or *Tutjikamanitjikana*. The particle *ma* receives a very extensive use in this language, as, for instance, *altamalta*, "day by day" or "daily;" *nintamininta*, "one by one;" *putamaputa*, "hill by hill" or "every hill." In the present case it means "again," so that the meaning is "I beat again not being"—*i.e.*, "I shall not beat again." The positive phrase "I shall beat again" they express by *tutjikantema*, where *ntema* means "again." Conjugation similar to above.

IV. *Tutjikerama*, "going to beat," is treated also in the same manner, as are also the two following:—

V. *Tutjilbitnima*, "come to beat," and,

VI. *Tutjalbuma*, "returned to beat.

VII. *Tutjigunala*, a somewhat different form, meaning "to beat by and by, not now." It is different, because, firstly, it is only a form of future tense; and secondly, its conjugation differs, as will be seen by the following:—*tu tutjigunala*, "I shall beat by and by;" *ilina tula narinja gunala*, "we two shall beat;" *anuna tula naririnja gunala*, "we shall beat."

Middle: *nukara tulala ninja gunala*, "I shall beat myself;" *ilinakara tulala narinja gunala*, "we two shall beat ourselves."

Reciprocal: *etnikara turirinja gunala*, "they shall beat each other."

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VIII. There remain only two more of these forms to consider, and they are not really forms of verbs, but consist only of a particle annexed to the Supine, which then gives the verb another meaning. The first is *tutjikatjilala*, "that I may beat quite alone," as, *arbuna inkaraka ta jainama, nukara ilknilitjikatjilala*, "the others all I send away, that I may wash myself quite alone."

The other is *tutjikatjora* or *tutjikatanga*, both meaning "that I may beat.

Ex.: *era erina kwatjuna retingaka, ekurara ilknilitjikatjora* or *tanga*.
"he him to the water led that he may wash himself."

Neither can be brought into other forms.

CHAPTER XI.

Some other Forms of the Imperative.

Two of these have been seen already in Chapter VII., which can consequently be omitted here. But there are still some others, which have to be considered, but as there is neither any irregularity as regards conjugation, nor any difficulty in the form, they need only be specified as follows:—

I. tulatana! beat!
tula naratana! beat you two!
tula nariratana! beat you!

II. tula nalgurai! beat a little or slowly!
tula naralgurai! beat you two a little!
tula nariralgurai! beat you a little!

III. tualgurai! beat quickly!
turalgurai! you two beat quickly!
turiralgurai! you beat quickly!

IV. tuarpa! beat for certain!
tula nararpa! you two beat for certain.
tula narirarpa! beat you for certain!

CHAPTER XII.

Verbs combined with "tutna," and Derivations therefrom.

There are only two expressions with the original form "tutna," which seems to correspond to the Greek optative mood, for it means *to wish or desire to beat.*

The first is, *ta tutna*, "I wish to beat," and the other, *ta tutna nama*, "I would beat, being angry." There is no difficulty as regards conjugation, and they are treated in the same way as other verbs, the only differences being—

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I. In the negative form, which runs thus: *ta tutna gunia*, "I do not wish to beat;" *ilina tula naratna gunia*, "We two do not wish to beat;" whilst in the other verbs it runs, *ta tutna nitjikana*, "I would not beat."

II. In the form of Middle and Reciprocal, where the first verb, "*tutna*," takes the general form: *nukara tulatna*, *ilinakara tula naratna*, &c., but the other verb, "*tutna nama*," is treated as shown by Table I., Appendix, viz., *nukara tulatna nama*.
ilinakara tulatna narama.

Reciprocal: *ilinakara turatna nama*, &c.

Another verb belonging to this class is, "*ta tuatnama*," meaning, *I beat only a little.*

Other verbs are altered similarly, as, *ta ilkuma*, "I eat;" *ta ilkutna*, "I wish to eat;" *ta ilkwatnama*, "I eat a little."

It is treated like the last-mentioned one, the negative form only being slightly altered, namely, from *tuatnitjikana* into *tuatninja gunia*, however, it is scarcely in use, for they express themselves then positively and say "I beat very much." All other tenses and moods of these are formed regularly.

From this last verb there are derived a number of other forms of verbs, which, as they present no difficulty as regards conjugation, being mostly treated like those above, need not be considered especially, but it will be enough to enumerate them and give the translation. They are the following:—

I. *ta tuatna lama*, "I beat arrived at another place,"
II. *ta tualba nama*, "I beat sometimes arrived at another place."
III. *ta tuatnitnima*, "I beat continually."
IV. *ta tualbuntama*, "I beat running away."
V. *ta tuatnauma*, "I beat some."
VI. *ta tuatalalbum*, *ta tulbatuatnama*, *ta tuatilbuma*, all three meaning "returning homeward, I beat on the road" or "between another place and my home."
VII. *ta tuatnalbuma*, "come here" or "hither, I beat," meaning, of course, from the point or place the speaker is standing.
VIII. *ta tuatnilbitnilalbuma*, "returning come near my home, I beat"—*i.e.*, "almost returned I beat."

Of the two forms, *tuatilbuma* and *tuatilbitnima*, it is to be remarked that they are changed in the Middle voice into *tulatulalbuma* and *tulatulilbitnima*, and in the Reciprocal form into *turaturalbuma* and *turaturilbitnima*. The particle of the Dual and Plural, however, is inserted, as is usual, in the auxiliary verb, *nama* or *nima*.

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There are, again, three other verbs which are connected with these, as will be seen by the translation—

I. *ta tuanjama*, "returning I beat on the road," which is in Dual and Plural of the Active as well as of Middle and Reciprocal connected with the auxiliary verb *lama*, as, *ilina tuanja larama*, *ilinakara tulinja larama*, &c.

II. *ta tuanjilbitnima*, "I beat shortly after started on road going home."

III. *ta tuanjilbuma*, "almost arrived at home I beat."

Both are regularly conjugated; the particle of the Middle *la* or *li* is added to the root of the verb, as *nukara tulinjilbitnima* and *tulijalbuma*.

There remain only two more forms to be mentioned, which have both one meaning, only the latter is augmented—

I. ta tunama.
ilina tunerama.
anuna turira nama.
Middle: nukara tula nama.
Reciprocal: ilinakara tura nama.

II. *tulbatunama*, "I beat going away quickly."

Corresponding with the latter is *tuatilbanama* or *ilkwalkilbanama*, "I beat or eat going away on the road.

CHAPTER XIII.

Sundry Moods and Forms not mentioned in Chapter VI.

There are some conditional forms which have to be mentioned here, as they are of frequent occurrence—

I. *ta tumalamikana namara*, I should not have beaten;

II. *ta tumaranga* or *tumalanga*, "I should have beaten;"

as, for example, *unta nala namanga*, *kalja nuka ilumalamikana namara*, "if you would have been here, my brother would not have died," *i.e.*, "if thou had'st been here my brother had not died."

The first can also be expressed by putting before the conditional mood the negative word *itja*, "no," as, *itja ilumara*, "had not died;" or by *tumalikananga*, as, *unta bitjimalikananga*, *kalja nuka ilumara*, "if thou hads't not come here, my brother would have died."

Again, the first form can be used without the conditional, *namara*, then meaning, "*not beaten*," or "*because not beaten*;" as, *era namalamikana*, *mandera inimalamikana*, "because he was not here, he got no shirt."

When a question is put to anyone else, the verb takes another form, as, *woka unta tuikana?* "Why you have beaten not?"

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The same form can also have a conditional meaning, as, for example, *era ntaineikananga, ta ntainakala,* "because he has not speared, I have done so."

The same form without the termination of the participle, "*nga,*" "*tuikana,*" has again another meaning, as, *rula jinga entai, ta tuikana,* "give me a stick that I may beat," which is rather a form of optative.

Another form is *woka unta tumarpa,* or perfect *woka unta tukarpa?* which is a prohibitive form, meaning, "what for you beat?" at the same time expressing, *it is not right to do so, and also that the speaker himself saw it, which we cannot express in one word at all.*

Finally, there are still to be specified some forms which are only either reduplications of the verb, or else augmentations. Such are—

I. "*Tutjinabuta tutjinabuta,*" or "*tutnabutatunabuta,*" both meaning, "I shall beat again."

II. *Tulinja tulindama,,* "to beat always;" *wulinja wulindama,* "to hear always;" *lalinja lalindama,* "to go always."

III. *tulinja mbura,* also signifying, "to beat always."

IV. *tulatulauma,* "to beat seldom;" *rualilalauma,* "to run seldom" (water in creeks), as, *mbonta rualilalauma* "The Finke runs seldom."

V. *tuma,* "I have finished beating;" *ilkuma,* "I have finished eating." The Negative is expressed by *tunikana* and *ilkunikana,* "I have not finished beating or eating."

VI. *bitjima,* "to come," but *bitjimalalkura,* "just arrived."

CHAPTER XIV.

Conclusion.

It is evident from the foregoing that the language of these Australian natives is by no means as simple as many are inclined to think. Certainly, as compared with the languages of other more intelligent races, it is to be called poor; but the chief cause of this is, according to my opinion, their isolation. Owing to the localities capable of supporting human life being so far distant from each other, it necessitates a division into very small fragments of tribes, each often consisting only of a few families. However, for objects that they can see and hear of in their daily life, they have words and expressions enough. Take for instance the verb, how many different forms they can obtain from a single verb! As seen by Table II., Appendix, they can form not less than 300 different phrases.

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Now there are many forms, which have been considered in the foregoing chapters, which can be brought into all the moods and voices of Table II., Appendix. There are 30 at the least which can be thus regularly conjugated, that means, from one mood can be made 9,000 different phrases. There are others again which can only be used in some moods and tenses, forming about 600 phrases, so that 9,600 expressions may be derived from one mood, Certainly there are some verbs which cannot be conjugated regularly, but are more or less defective. For instance, "to eat" cannot have either a Middle or a Reciprocal form; but the transitive verbs generally can be brought into all moods and voices.

Those mentioned do not embrace all, but they are those mostly used.

These pages do not profess to give a complete grammar of the language, but merely such an outline as may give a general indication of its structure. There are many expressions related herein which would require a philologist to classify or properly arrange, and any hints in this direction would be thankfully received by the writer.

Though it is scarcely worth while learning the language of these tribes, as their number is small, and it would be much easier at once for a missionary to teach them the English language, yet how can this be done unless first their language is understood? For every English word must be first translated to them, if they are to properly understand it. Experience has shown that many of these natives can speak more or less English, but when questioned as to the meaning of words, they either are unable to answer, or else they give a wrong translation. For instance, a young man, who gave to all questions put to him the same stereotyped answer, "All right, my boy," most likely heard this expression once from a white man, and thought it would answer upon all occasions. This only shows how ignorant they often are about the expressions they use, and how necessary it is to learn first their language, though it demands a great expenditure of labour, which, however, carries its own reward in a better mutual understanding between teacher and pupil.

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APPENDIX.

TABLE I.

SHOWING THE CONJUGATION OF THE AUXILIARY VERB, NAMA—TO BE.

INDICATIVE MOOD.

Present Tense.

POSITIVE.

Singular.

jinga nama—I am.
unta nama—thou art.
era nama—he, she, it is.

Dual.

ilina narama—we two are.
mbala narama—you two are.
eratera narama, they two are.

Plural.

anuna narirama—we are.
arankara narirama—you are.
etna narirama—they are.

NEGATIVE.

Singular.

jinga nitjikana—I am not.
unta nitjikana—thou art not.
era nitjikana—he is not.

Dual.

ilina naritjikana—we two are not.
mbala naritjikana—you two are not.
eratera naritjikana—they two are not.

Plural.

anuna nariritjikana—we are not.
arankara nariritjikana—you are not.
etna nariritjikana—they are not.

Perfect Tense.

POSITIVE.

jinga nakala—I have been.
ilina narakala—we two have been.
anuna narirakala—we have been.

NEGATIVE.

jinga nitjimakana—I have not been.
ilina naritjimakana—we two have not been.
anuna nariritjimakana—we have not been.

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Future Tense.

POSITIVE.

jinga nitjina—I shall be.
ilina naritjina—we two shall be.
anuna nariritjina—we shall be.

NEGATIVE.

jinga nitjigunia—I shall not be.
ilina naritjigunia—we two shall not be.
anuna nariritjigunia—we shall not be.

CONDITIONAL MOOD

Present Tense.

POSITIVE.

Singular.

jinga namara—I should be.
unta namara—thou would'st be.
era namara—he would be.

Dual.

ilina naramara—we two should be.
mbala naramara—you two would be.
eratera naramara—they two would be.

Plural.

anuna nariramara—we should be.
arankara nariramara—you should be.
etna nariramara—they should be.

NEGATIVE.

Singular.

jinga namarela—I should not be.
unta namarela—thou would'st not be.
era namarela—he would not be.

Dual.

ilina nala naramarela—we two should not be.
mbala nala naramarela—you two would not be.
eratera nala naramarela—they two would not be.

Plural.

anuna nala nariramarela—we should not be.
arankara nala nariramarela—you would not be.
etna nala nariramarela—they would not be.

Perfect Tense.

Only one form for Present and Perfect.

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Future Tense.

jinga nitjinala—I should be.
ilina naritjinala—we two should be.
anuna nariritjinala—we should be.
jinga nitjinala gunia—I should not be.
ilina naritjinala gunia—we two should not be.
anuna nariritjinala gunia—we should not be.

IMPERATIVE MOOD.

POSITIVE.

nai !—be !
mbala narai !—you two are !
arankara narirai ?—are you ?

NEGATIVE.

nitjala—be not !
mbala naritjala—you two are not.
arankara nariritjala—we are not.

SUPINE.

POSITIVE.

jinga nitjika—I must be.
ilina naritjika—we two must be.
anuna nariritjika—we must be.

NEGATIVE.

jinga nitjala nitjika—I must not be.
ilina naritjala nitjika—we two must not be.
anuna nariritjala nitjika—we must not be.

PARTICIPLES.

Present.

POSITIVE.

jinga namanga—I being.
ilina naramanga—we two being.
anuna nariramanga—we being.

NEGATIVE.

jinga nitjikananga—I not being.
ilina naritjikananga—we two not being.
anuna nariritjikananga—we not being.

Perfect.

POSITIVE.

jinga namala—I been.
ilina naramala—we two been.
anuna nariramala—we been.

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NEGATIVE.

jinga namalikana—I not been.
ilina naramalikana—we two not been.
anuna nariramalikana—we not been.

Future.

POSITIVE.

jinga nitjinanga—I shall being.
ilina naritjinanga—we two shall being.
anuna nariritjinanga—we shall being.

NEGATIVE.

Wanting.

TABLE II.

SHOWING THE CONJUGATION OF THE TRANSITIVE VERB, TUMA, TO BEAT.

ACTIVE VOICE.

INDICATIVE MOOD.

Present Tense.

POSITIVE.

Singular.

ta tuma—I beat.

Dual.

ilina tula narama—we two beat.

Plural.

anuna { tula narirama, / tulta nama, } we beat.

NEGATIVE.

Singular.

ta tutjikana—I beat not.

Dual.

itina tula naritjikana—we two beat not.

Plural.

anuna { tula nariritjikana, / tulta nitjikana, } we beat not.

Perfect Tense.

Singular.

ta tukala—I have beaten.

Dual.

ilina tula narakala—we two have beaten.

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Plural.

anuna { tula narirakala, / tilta nakala, } we have beaten.

NEGATIVE.

Singular.

ta tutjimakana—I have not beaten.

Dual.

ilina tula naritjimakana—we two have not beaten.

Plural.

anuna { tula nariritjimakana, / tulta nitjimakana, } we have not beaten.

Future Tense.

POSITIVE.

Singular.

ta tutjina—I shall beat.

Dual.

ilina tula naritjina—we two shall beat.

Plural.

anuna { tula nariritjina, / tulta nitjina, } we shall beat.

NEGATIVE.

Singular.

ta tutjigunia—I shall not beat.

Dual.

ilina tula naritjigunia—we too shall not beat.

Plural.

anuna { tula nariritjigunia, / tulta nitjigunia, } we shall not beat.

CONDITIONAL MOOD.

Present Tense.

POSITIVE.

Singular.

ta tumara—I should beat.

Dual.

ilina tula naramara—we two should beat.

anuna { tula nariramara, / tulta namara, } we should beat.

NEGATIVE.

Singular.

ta tumarela—I should not beat.

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Dual.

ilina tula naramarela—we two should not beat

anuna { tula nariramarela, / tulta namarela, } we should not beat

Perfect Tense.

Wanting.

Future Tense.

POSITIVE.

Singular.

ta tutjinala—I shall perhaps beat.

ilina tula naritjinala—we two should beat.

anuna { tula nariritjinala, / tulta nitjinala, } we should beat.

NEGATIVE.

Singular.

ta tutjinala gunia—I shall perhaps not beat.

ilina tula naritjinala gunia—we two should not beat

anuna { tula nariritjinala gunia, / tulta nitjinala gunia, } we should not beat.

IMPERATIVE MOOD.

POSITIVE.

Singular.

tuai—beat.

Dual.

tula narai—you two beat.

Plural.

tula narirai, / tulta nai, } beat you.

NEGATIVE.

Singular.

tutjala—beat not.

Dual.

tula naritjala—you two beat not.

Plural.

tula nariritjala—beat you not.

Supine.

POSITIVE.

Singular.

ta tutjika—I must beat.

Dual.

ilina tula naritjika—we two must beat.

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Plural.

anuna { tula naritjika / tulta nitjika } we must beat.

NEGATIVE.

Singular.

ta tutjika gunia—I must not beat.

Dual.

ilina tula naritjika gunia—we two must not beat.

Plural.

anuna tula nariritjika gunia—we must not beat.

PARTICIPLES.

Present.

POSITIVE.

Singular.

ta tumanga—I am beating.

Dual.

ilina tula naramanga—we two are beating.

Plural.

anuna { tula nariramanga, / tulta namanga, } we are beating.

NEGATIVE.

Singular.

ta tutjikananga—I am not beating.

Dual.

ilina tula naritjikananga—we two are not beating.

Plural.

anuna { tula nariritjikananga, / tulta nitjikananga, } we are not beating.

Perfect.

POSITIVE.

Singular.

ta tumala—I was beating.

Dual.

ilina tula naramala—we two were beating.

Plural.

anuna { tula nariramala, / tulta namala, } we were beating.

NEGATIVE.

Singular

ta tumalikana—I was not beating.

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Dual.

ilina tula naramalamikana—we two were not beating.

Plural.

anuna tula nariramalamikana—we two not beating.

Future.

POSITIVE.

ta tutjinanga—I shall be beating.

ilina tula naritjinanga—we two shall be beating.

anuna { tula nariritjinanga, / tulta nitjinanga, } we shall be beating.

NEGATIVE.

Like Future in Indicative Mood.

Middle Voice.

WITH SOME RECIPROCAL FORMS.

INDICATIVE MOOD.

Present Tense.

POSITIVE.

Singular.

nukara tulakna—I beat myself.

Dual.

ilinakara tulala narama—we two beat ourselves.

Plural.

anunakara tulala narirama—we beat ourselves.

etnikara turirama—they beat each other.

NEGATIVE.

Singular.

nukara tulitjikana—I beat myself not.

Dual.

ilinakara tulala naritjikana—we two beat ourselves not.

Plural.

anunakara tulala nariritjikana—we beat ourselves not.

etnikara turiritjikana—they beat each other not.

Perfect.

POSITIVE.

Singular.

nukara tulakala—I have beaten myself.

Dual.

ilinakara tulala narakala—we two have beaten ourselves.

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Plural.

anunakara tulala narirakala—we have beaten ourselves.
etnikara turirakala—they have beaten each other.

NEGATIVE.

Singular.

nukara tulitjimakana—I have not beaten myself.

Dual.

ilinakara tulala naritjimakana—we two have not beaten ourselves.

Plural.

anunakara tulala nariritjimakana—we have not beaten ourselves.
etnikara turiritjimakana—they have not beaten each other.

Future.

POSITIVE.

nukara tulitjina—I shall beat myself.
ilinakara tulala naritjina—we two shall beat ourselves.
anunakara tulala nariritjina—we shall beat ourselves.
etnikara turiritjina—they shall beat each other.

NEGATIVE.

The Negative is formed by adding "gunia," as,
nukara tulitji gunia, &c.

CONDITIONAL MOOD.

Present Tense.

POSITIVE.

Singular.

nukara tulamara—I should beat myself.

Dual.

ilinakara tulala naramara—we two should beat ourselves.

Plural.

anunakara tulala nariramara—we should beat ourselves.
etnikara turiramara—they should beat each other.

NEGATIVE.

"gunia" to be added to the positive.

Perfect wanting.

The Present Tense used instead.

Future.

Singular.

nukara tulitjinala—I shall beat myself.

Dual.

ilinakara tulala naritjinala—we two should beat ourselves.

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Plural.

anunakara tulala nariritjinala—we should beat ourselves.
etnikara turiritjinala—they should beat each other.

NEGATIVE.

Formed by adding "gunia."

IMPERATIVE MOOD.

POSITIVE.

Singular.

unkwangara tulai !—beat yourself !

Dual.

mbalakara tulala narai !—you two beat yourselves !

Plural.

aragankara tulala narirai !—beat yourselves !
aragankara turirai !—beat each other !

NEGATIVE.

Singular.

unkwangara tulitjala !—beat not yourself !

Dual.

mbalakara tulala naritjala !—you two beat not yourselves !

Plural.

aragankara nariritjala !—beat not yourselves !
aragankara turiritjala !—beat not each other !

Supine.

POSITIVE.

Singular.

nukara tulitjika—I must beat myself.

Dual.

ilinakara tulala naritjika—we two must beat ourselves.

Plural.

anunakara tulala nariritjika—we must beat ourselves.
etnikara turiritjika—they must beat each other.

NEGATIVE.

With "gunia" added.

PARTICIPLES.

Present.

POSITIVE.

Singular.

nukara tulamanga—beating myself.

Dual.

ilina tulala naramanga—we two beating ourselves.

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Plural.

anunakara tulala nariramanga—we beating ourselves.
etnikara turiramanga—they beating each other.

NEGATIVE.

Singular.

nukara tulitjikananga—I not beating myself.

Dual.

ilinakara tulala naritjikananga—we two not beating ourselves.

Plural.

anunakara tulala nariritjikananga—we not beating ourselves.
etnikara turiritjikananga—they not beating each other.

Perfect.

POSITIVE.

Singular.

nukara tulamala—I was beating myself.

Dual.

ilinakara tulala naramala—we two were beating ourselves.

Plural.

anunakara tulala nariramala—we were beating ourselves.
etnikara turiramala—they were beating each other.

NEGATIVE.

Singular.

nukara tulamalikana—I was not beating myself.

Dual.

ilinakara tulala naramalamikama—we two were not beating ourselves.

Plural.

anunakara tulala nariramalamikana—we were not beating ourselves.
etnikara turiramalikana—they were not beating each other.

Future.

POSITIVE.

Singular.

nukara tulitjinanga—I should beat myself.

Dual.

ilinakara tulala naritjinanga—we two should beat ourselves.

Plural.

anunakara tulala nariritjinanga—we should beat ourselves.
etnikara turiritjinanga—they should beat each other.

NEGATIVE.

Expressed by adding "gunia" or "itja."

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VOCABULARY.

A

aai (interj.), hear !
abula, somewhere else
agala, pale
airima, to see
airilalabuma, to look round, look about
akutnama, to lift the arm for beating
albula, till
albolja, very old
ala, the nose
alama, the liver
alatjura, nostril
alaurba, the bone of the nose
albanata, cloudy, dark
albalbaka, first part of the summer
albantiuma, to throw abroad
albara, young, healthy
albmelama, to answer, to tell
albuma, to return
algabma, poor, meagre
algala, pale
algara, green-shining like emu eggs
alinama, to be taken with convulsions, dying
alinga, the sun
alinja, the tongue
alinta, flame
alkanama, alkanalama (refl.), } to vomit
alkaralkara, shining, clear
alkielba, transparent
alkira, bright, not cloudy
alkirabinjanga, high
alkna, eye
alknagoda, eyeball
alknailpula, eyelash
alknajinba, eyelid
alknajunta, the orbit
alknalginja, awake
alknanbuma, alknalgama, } to bloom, to flower
alknalanbanama, to look angry
alknalurara inbuma, to overlook
alknatuma, to burn
alknaltara, clean, clear
alknatera, public
alknanterama, to torment
alknaralama, to look backward
alknatera airima, to see the thing itself
alknantangera, like fire
alknanta, blood-thirsty
alknanta, the temple
alknenera, a beetle
alknenta, sideways
alknentama, to look sideways
alkniltera airima, to squint
alkningera, eyebrow
alknira, evening
alknolja, tears
alknortja, embryo
alknotna, jealous
alknultinkama, to drown
alkultakakulterama, to feel disgust
alkura (comp.), more
alta, daylight
altagatjagatja, moonlight
altabatera, twilight in the morning, daybreak
altagalta, free
altalinama, altalinanama } to snap
altama, to pull out (feathers)
altamalta, daily
altarama, to find
altjiuma, to flow over
altjura, a hole
altola, west
altolakwa, western
alua, blood
alululama, to bleed
ambarinila, immediately
ananta, exhausted
anbuma, to touch with the hand
anbalanbalama, to enquire, to investigate
anbaela, anbara, } then, there on
andera, fat
angnera, the face
angna, seed, fruit
anjua, nest
ajua, an old man
anka, green, unripe
ankalabum, to hum (as insects)
ankama, to speak
ankaratjauma, to revolve
ankatauma, ankatalama, } to turn round, to whirl
ankataritjalama, to turn himself round
ankatala, thirsty
ankatamea, a drink
ankata, the cloud
ankatiuma, to roll
ankatja, language, sound
ankielta, guest
ankua, sleepy
ankuerama, to go to sleep
ankuindama, to sleep
ankurilama, to be contented

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anma, in a long time
anmangaletakata, long living
antaka, wide, broad
antakira, south
antakirakwa, southern
antakerama, to become wide
antangalama, to stray, to lose himself
antanama, antalabuma, to steal upon
antata, flower
antina, opossum
antjitataka, joyful together
anuna, we
apma, the snake call
arailama, aroitama, arilberitjama, speaking low, to whisper
arailabuma, to look after or round
aralbuma, to evaporate
araltama, to forbid
arankama, to cry, to scream
araltagama, to cut, to prune
aranbouma, to mock
arankara, you
aragankara, yours
aratja, aratna, straight, right, true
araltutjaltutja, bold, daring
aranta, tired
arabmaramara, the palate
aranga, grandfather
aragata, mouth
ara, wrath
aragutja, woman
aralitja, a stick
arankaia, palmtree
aramatula, a parrot's bill
aranbilama, to distribute
aranjikama, to challenge
arauna lama, to go to enemies
aranelilama, to greet, to salute
arartilama, to defend
aratalila nama, to lead out
ararama, to choose, to select
araratala tuma, to punish
arartankama, to defend with words, to excuse
araierama, to long for
aratama, aratinjama, to arise (as the sun)
aratinjalama, to come or go out
arbarmaninja, in some time
arbalama, to know not
arbmanama, to create
arbmanarinja, Creator
arbmaninja, creature
arbunarba, that
arbukarba, those
arbuntarpa, obstinate
arbuna, arbukarpa, another
arbuma, to hew, to trim
aregna, name
arelbilama, to sharpen, make sharp
arelguma, to compel
areola, outside
arelba, sharp
arenka, too quick
areratna nama, to make angry, to vex
arerama, arilerama, to become angry
areba, albara, wooden tray
argalaworkala nama, to poison
argana, joy, pleasure, play
arganabiljabilja, kind, smiling
argana, joyful, glad
arganabutanga, very joyful
arganerama, to become glad
arganilama, to make glad
argulargua, owls
argutilama, to hear, to hear over
arina, there
arita, solid, firm
arilabatia, eatable
arilamata, sandy
arinta, angry
ariltjirka, a sucker on trees
arila, sand, earth, land
arilarkna, clay
arilinga, the jaw
arinbinba, the lip
ariljitna, arilatna, the lungs
arilanbuma, to quarrel, to dispute
arilerama, to decay
arinama, to put
arinilanama, to put
arilgama, becoming day
arkanama, to taste, to try
arkaninjagaba, taste
arknamanalama, to agree
arknantaiuma, to protect
arknanterama, to hold up
arkatnia, industrious
aroa, rock-wallaby
arotuma, to press
artata, hard, firm
artjarerama, to determine
artjanbuma, to stamp with the feet
artjilanama, artja nama, to depart, to go away
arugula, first
arungulta, poisonous

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aruilkara, a white cockatoo
arunama, to beat an innocent one
atanja, in spite of
atmunka, rats
atna, dung
atnindurka, the rectum
atua, a man
auma, to hear

B

babuterama, to cease
babauma, to catch, infect (sickness)
bailka, a bag, the bark of trees
bailkiuma, to strip off the skin, to bark
bailbilama, to lose
bakana, finished
bala nama, to walk about
bala lama, to stray
balaka, content
bala, wrong
balkala, in vain, useless
balkama, to bleach (flowers)
balatama, shy, timid
balaka, improvident
balka, pale
balia, distant
balba-barbuta, strange, indistinct
balera nama, to go astray
balkala ntema, to give to the wrong one
balkara, blue dove
balteratjata, slippers worn to conceal trail
batula, the pouch of kangaroos
balupa, the shoulder
baluka, bread
banama, to build, to paint
banalama, to paint himself
bangerama, to become blind
banga, blind
banba, everywhere
bania, small-pox or measles
banta, bakala, } wooden trays
barkuma, to assist, to help
baritjulba, mushrooms
bara, a tail
baeta, the tail of a snake
bartja, shining
bartjima, to shine, to glare
bataba, peaceable
batakerama, to turn (wind)
batakilama, to instruct
batalilama, to show the road, to call back
batakilama, to remember, to recollect
batalilama, to bend the knees
baterama, to go backward, to turn away
batama, cannot
bateatapa, impossible
bauma, to thrust, to knock down
bebilama, to calm, to quiet
belkua, again
benja, a spring of water, permanent water, salt-water
bira, red gum-tree (eucalyptus)
birka, charcoal
bitjima, to come
bitjalbuma, to come back, to return
boanka, breath
boankama, to breathe
bokarabokarerama, to stagger, to tumble
bola, saliva
boliuma, to spit
boilama, to blow
borerama, to be ashamed
borilentama, to flash
bota, a ball
bolda, a blister
botera, short
bora, shameful, sorry
borka, tired
bonta, blunt
bokarabokara, boggy, swampy
botilama, to make balls
boterama, to drain (water)
bula, but
bulknala, immediately, directly
bulja, loose, soft (sand)
bulkna, without intention
buka, perhaps, likely
bultabulterama, to get full of bladders
bultingama, to burst asunder
bultinjirkerama, to perish by thirst
bunabuna, empty
bunabunerama, to cover with dust

D

dalbadalba, shells, mussel-shells
dama, to grind (between two stones)
damba, loose, breakable
dana, cold
dantama, to close, to shut
datilama, to make wet, to moisten
data, wet, moist
data, soon
datagunama, to conquer, to overwhelm
deta, detja, teeth
detalura, the gums
debadeba, birds

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dirkadirka, green (colour)
dolta, tired
dolka, low, horizontal
dotadota, short
dolterama, to become tired
dueda, another
dueterama, to change, to make a mistake
duetagudeda, different ones

E

eamitja, a deep hole
ebminja, useless
ebminjerama, to become useless
ega, scab, scurf
egunja, ashes
egnakalinga, different, unequal
egnarbegnarba, from all directions
egnagegna, single
egna, alone
egnagegnilama, to separate, to unfold, to make asunder
egutnanama, to catch up
ekaltilama, to fix, to make firm
ekalta, strong, firm, powerful
ekaltanumerumera, very strong, almighty
ekna, very sick, stiff
eknira, east
eknirakwa, eastern
eknakarinja, family
ekunama, to fetch
eknuma, to marry
ekarama, to dress
ekura, his
ekuratera, there are two
elgata, hill, mountain, ridge
enkua, almost, nearly
enta or anta (suff.), only
era, he
eratera, they two
erama (aux. verb), to become
eraginja, chaste
erapera, bent backwards
eraitinga, the comb of birds
eranbutinama, to circulate (reports)
erabukama, erabakanama, } to go round anything
eraganama, to hunt
erankerama, to grind with the teeth, being in wrath
ererentama, to borrow
erauia, weapons
erguma, to hold, to keep
erilkna, dead
erinta, cold
erila, man
erilknabata, ancestors
erinja, devil
eritja, eaglehawk
eritjinta, the Southern Cross
eroutja, an ulcer, an abscess
eroaltjatuma, to revenge
eroanberama, to disperse (clouds)
eroatja, light, cloudy
erora, young, fresh
erouma, to tremble, to shiver
erunjutna, dark, overcast
erunja, liberal, munificent
eruntarerama, to go out of the way
erukanerama, to get excited
erukanilama, to excite
erunjauma, erakama, } to tremble (in general)
eta, the throat
etakama, to flee, to run away
etaliralabuma, to remember
etalingetala nama, to understand
etalingetala, reason
etama, to make fire
etalirama, to recolleet
etaeta, stupid
etalinga, yet, in spite of
etapatikana, far away
etatja, slanting
etatagia, dangerous
etatnama, to choke, to strangle
etata, alive
etera, the shore
eterama, to become deaf
etna, they
etnetnauma, to tell, condemn, or curse
etnika, their
etopala, outside
etopa, a belt
etopatopa, an edge
etopalerguma, to gird
etopalergulama (refl.), to gird
etuanama, etuilama, } to mince (meat)
etuaratuarabenama, to boast
etulbmerama, to be suffocated
etuna, very warm, hot
etuanga, bold, courageous
ewolama, to lean against

G

gabmara, the top of the head
galagala, mistaken
galagalerama, to be on or go a wrong way
galtja, wise, knowing
galtjerama, to become wise to teach
galtjentama, to make wise, to teach
gama, to cut

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galkata, the bud (of flowers)
gamba, delicate, well-tasting
galtjentanentana, a teacher
gara, meat
garra, clay-ground
garilkama, to cry out, to weep
garknanteulama, to penetrate
garalima, to expect something or someone
gartja, sharp, cutting
gata (suff.), with
gatala, outside, open, clean
gatairima, to look into
gatilama, to make open, clean
gataterilama, to cut off
gaterinama, to begin, to start
gaualama, to swing
gninama, to lend, to borrow
gnama, to dig
gnagnignama, to dig deep
goda, an egg
godna, ignorant, unwise
gola, hair, long hair
goltama, to cover, to protect
goltalama (refl.), to cover himself
guierama, to wink, to make a sign
gulelberama, to get stiff
gulatja, ornament for the neck
gultja, ornament for the arm
gunama, to put into
gunbanama, to be lazy, idle, innocent, not active
gunba, lazy, idle, not active, innocent
guruna, the soul
gutaka, left hand
gurunga, gurungatjina, } then, after that
gurknalilama, to forbid

I

ibatja, milk
ibatjangna, breast (of females)
ibarkna, the pleura
ibinja, a stranger
idunta, the stomach
ikala, dough
ikalilama, to make tough
iknima, to fall, to fall off
iknitjikalama, to fall down
ilalima, to offer
ilama, to say
ilangara, what time?
ilbangintala, obstinate, disobedient
ilbaleala, safe, saved
ilbirtja, gray
ilbatjaltjura, willing, obedient
ilbminta, powerful
ilbakutaka, willing, industrious
ilbarurtmurka, inaudible
ilbunkara, not smeared with fat or colour
ilbarilbera, shortly before evening
ilbanama, to accuse
ilbarinama, to teach, to tell
ilbararanama, to hang up
ilbankama, to know
ilbaleala nama, to be safe
ilbaiuma, to doubt
ilbmarawuma, to babble
ilbamba, a carcass
ilbirba, large leaves
ilbula, small leaves
ilbminta, power, strength
ilba, the ear
ilbatopa, the ear-lap
ilbanta, general rain
ilbmara, dew
ilbalunga, intia, } a cave
ilelilalama, to paddle, to dabble
ilgaia, the cheeks
ilgagama, to outwit
ilgarkama, to be frightened or alarmed
ilganama, to sift, to winnow
ilgulilgulalama, to walk about
ilgulelgua, in all directions
ilgaginja, cunning, sly
ilga, quiet, settled
ilitja, green, unripe, under-done (meat)
ilelalbuma, to dictate
ilimbina, a leader, hero
ilia, an emu
iliapa, feathers of emus
ilirtja, a furrow, a trench
ilinja, a song
ilima, to sing
ilina, we two
ilirtjilama, to burst through (water)
ilingauma, to twist
ilkagama, to call attention to
ilkama, to call or cry out
ilkatjintama, ilkatnatjintama, } to crow
ilkaterama, ilkatinjama, } to ache
iltaratuma, to knock at (a door)
iltama, to quarrel
iltarba, sorry, sorrowful
iltjakiltjirka, ugly
iltjanja, beefwood
iltja, the hand
iltjaganja, the finger
iltjerama, to rest

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ilulama, to dress out, to undress
ilulinjalama, to climb down
ilunama, to extinguish (fire)
iluma, to die, to go out (light)
iluma, to dry up (water)
imalalguia, } in great danger, unsafe
imalalkura, }
imanka, long time before
imankinja, very old
ima, condemned to die
imanama, to hand over to, to offer
imaralama, to dash (small waves)
imatoalima, to dash (large waves)
imateuma, to roll up
imambula, danger
imbara, a sign, track, annual rings of trees
imbulkna, a scar, a mark
ilkata, pain
ilkapala, full (moon)
ilkatilama, to cause pain
ilknariuma, to skin
ilknima, to wash, to wipe away
ilknagama, to force away
ilknuinama, to castrate
ilknilbiknima, to stagger
ilkwaterilama, to help, assist, to accompany
ilknakama, to divide, to separate
ilkwatera, assistance, companionship
ilkankula, storm
ilknira, naked, poor
ilkaunkuanta, quick
ilkna, wet, moist
iloutja, miserable
ilotuma, to throw down
ilpanama, } to fly
ilpulangalama, }
ilta, a hut, a house
iltariuma, to crack
iltarkama, to rattle
iltarkalilama, to make a rattling
iltirbminjatuma, to beat time
ilulitijikatjila erauma, to tremble with age
imbaninbana, cautious
imbanintuma, to have pity
imbuma, to let, to permit
imbulama, to leave (act)
imbalalbuma, } to forsake, to leave
imbalalama, }
imilama, to condemn
impanama, to sift
inola, a spider
inalbuma, to take back
inanga, the arm
inara, patiently
inankala, wise, knowing
inbanama, to pass or go over
inbora, heavy
inbotna, hail-stones
inbirka, centipede
indota, clever
indora (superlative), very
indotilama, to adorn
indaltja, grasshoppers
indama, to lay down, to belong
ingalama, to beget
ingama, to roar (as animals)
inguia, old
ingutnala, in the morning
ingunta, to-morrow
inguntarbuna, the day after to-morrow
ingua, night
inguarinja, } a night walker
inguarakwa, }
ingartja, a deep track
ingununga, maggots
inilalama, to get
ininga, beard
inima, to fetch
injakarilama, } to load upon
injakarauma, }
inkanja, shoulder
inka, the foot
inkatnita, the sole of the foot
inkaganja, the toe of the foot
inkalura, a hoof
inkarinka, a ladder
inkanja, a prayer
inkainama, to erect
inkariknima, to run out (water)
inkailalama, to fly up
inkama, to beg
inkalerama, to look angry, to become wicked
inkirililama, to make noise
inkanindama, to commit adultery secretly
inkutilama, to bend
inkantama, to follow the track, to track
inkaraka, } all
inkana, }
inkana, (also meaning) the last
inkilja, wicked, ugly
inkara, safe, without danger
inkutinkuta, crooked, bent
inkarinkara, slender, thin
inkarinjaka, altogether
inmanmaraulama, to shake the head
inmara, waves, mistletoe
intitjera, frogs

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intjaginja, poison tooth, the Magellan clouds
intoala, honey
intitja, sacrum
intalinja, Scripture
intalingagata, painted, coloured
inturka, fearless
intita, stink
intira, quick
intjirka, dry (grass)
intarinja, untransparent
intjaka, away
intitjinjama, to arise (smoke)
intjamauma, to unfold
intalelama, to write, to make signs
intarama, to snore
intjakalama, to go away
intarinjilama, to unite, bring together
intitakerama, to mimic
intitakerama, to speak for one
intunama, to fell (a tree)
intarerguma, to couple together
ipitalukaluka, rough, uneven
ipita, deep
irala, cast-off skin of a snake
iranta, black cockatoo
irakira, a sign
irbaltangirbalterama, to dare
irbunga, fishes
irbuma, to set (sun), to dip under water
irbukalalama, irbunama, irbunjama, } to go into
irboterama, imbulknerama, } to recover from sickness
irbanjairima, to look into
irbonba, all gone, doubtful
irbota, peaceful
irbonberama, to cease giving away
iregeririlama, to make ashamed
iregerirama, to be ashamed
irgarama, to scrape
irgungalalama, to pass over close by
irgapa, desert-oak *(Casuarina Decaisneana)*
irgua, pus
irgalanga, a skeleton
irgalla, a knife made of stone
irgatagama, to smart the eyes (as by smoke)
irgaiilama, to blind the eyes (as by the sun)
irgaia, invisible
irkwanta, courageous
irkitjawama, to spin
irknala, bark of trees
irkitja, worsted, a string
irkna, the husk of seeds
iroamba, disappearing, temporary
itangurula, the same number, equal
itaka, loose, shaking
itarinama, to catch
itaringama, to lead
itarinama, to pull, drag, or tear
itatjata ntema, to give again
itia, younger brother or sister
itiinjara, brothers and sisters
itinjalama, itinjanama, } to overtake (running)
itinja, there, close by
itinja, close at hand, very close
itja, no, none
itnima, to weep
itnora, shy, afraid
itoa, wild turkey
itapmara, the nails of the fingers and toes
iwupa, the web of a spider
iwuna, what?

J

jara, ants
jaramba, edible eggs of ants
jabera, pieces of bark to play with
jalta, coal
jainama, to send
jarauma, to peel
jalama, to think, to mean
jarinama, to bring thither
jakularilama, jabajaberama, } to enquire
jaralama, to search for
jakmama, to look at in astonishment
jakama, jakalilama, } to persuade
jartja, without branches
jalknajalkna, very bright
jalbajalba, with long hair
jana, and anka, cannot hear
jatama, to be frightened
jealbmelama, to give notice, to betray
jerentama, to exchange
jeriuma, to scrape off
jia, message
jinba, skin
jibunakana, a liar
jirira, north
juntama, to search
jibalilama, to deceive
jibarinama, to abnegate, to excuse
jibarinalama, to deny, to excuse himself
jinima, to bind

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jinilama, to refuse
jilbainama, to twist round (as snakes)
jibuma, to lie
jirama, to cease
jiranama, to disappear
jitalilama, to bend
jinga, I
jirkna, spiteful
jirirakwa, northern
jotia, heavy
juka, I don't know (probably an abbreviation)
jurka, bridle

K

kata, father
katailtja, one's own father
katalira, foster-father
kantirkna, the breasts of girls
kanta, ice, cold
kantakanta, round, a ring
kankinja, love, kindness
kankananka, a lover
kankinjaka, kankalta nama, } beloved
kaluka, a ram, bull
kakuta, a sort of hat
kaputa, the head
kakalala, white cockatoo
kabiljalkuna, pelican
kabuluma, to break, or make open
kabanentantema, to give gratis
kabia lima, to walk softly
kakabanama, to announce or give notice
kalkukalama, to halt, to limp
kankama, to love
kantatuma, to fix, to fasten
kankuerama, to obey
kantanama, to twist
kanjalbuma, to make a spear
kangalangalerama, to drown
karuntama, to dance, to stamp with the feet
katelanama, to close the eyes
katnalilama, to bring anything high up, to erect
katauliuma, to throw outside
katanairima, to look outside
katitjalama, to roll
katjikatjilama, to tickle
katjiamalkura, childish
kuralja, katitjina, } Orion (stars)
kana (the negative particle)
kala, enough
kankia, idle, lazy
kankinja, kind
katna, above
katninga, over, upon
katnantupa, katnanta, } against
kara, awake
keltja, a half, a piece
keltjilama, to halve
kieka (suff.), on, upon
knira, large, big, very
knota, whole
knirinjara, very much, very many
knirerama, to become big
knuerama, to forget
konja, sad, sorry, mournful
kokuma, to bite
kokitjagama, to embrace
konjerama, to become sad or sorry
konjilama, to make sad or sorry
kotjima, to gather
kotikama, to take down
kulkura, sweat
kumerama, to rise or wake up
kumeralama, to arise from bed
kumililama, to awake
kumalilanjalbuma, to fetch round
kumia ntjainama, to smell sweet
kunerama, to become bad
kunabinjalama, to charm
kurkerama, to become small
kubitjakubitjalama, to dash in pieces
kuterama, to remain
kutetalirama, to keep in remembrance
kurka, little, small
kuta, always
kumia, sweet (water, of good taste)
kuna, bad, sin
kumalinga, never
kwana, inside
kwaninguna, to set aside
kwanginga, left hand
kwatjakwatja, liquid
kwamalaria, safe, without danger
kwanama, to swallow
kwaniralakalima, to plunge into water
kwarinama, to hear or attend to
kwatjenkama, to thunder
kwatja, water, rain
kwatjaluralura, heavy rain
kwatjatnoatnoa, light rain
kwara, girl
kwatjambenka, a water-flood
kwatjabara, lightning
kwenja, protection

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L

la, lela (suff.), in, on, by, with, upon
labalilama, to roll into
labulbarerama, to die by starvation
lainama, to shake off
lainkerama, to fly away
lalknilama, to make ready
lalerama, to threaten
lalilama, to bring forth
lalerutnuma, to mix, to unite
lalama, to reject, to repulse
lamaknirilama, to be in debt
lanalabuma, to earn, to gain, to deserve
lanalama, to burst
lankarama, to know, to perceive
lankama, to blame
lama, to go
lanbuma, lanbilalama, } to flow over (water)
lankurutnama, to be embarrassed
langama, langerama, langarilama, } to mix
laragulara lama, to meet
larbiuma, to grind on a stone
larerama, laralama, } to swim (as men)
larabalanama, to swim (as birds)
laralabuma, to swim (as fishes)
lakakia, a close relation
lada, a branch, a point
lalta, liqueous earth
lalkira, a stick put through the nose
lalkinta, the germ
lanba, under the arm
lankalaria, knowledge
lankeia, a monster, a hideous man
latjia, jams
lamaknirilinja, debt
larabilara, rushes
lara, a creek, the Milky Way
laralilama, to wash away
lauma, to hide away
ladna, many
lalkna, ready, in order
lakina, so, this way, like this
lakinja, so many
lanjalanja, precious
laragulara, again
lata, to-day, soon
latinja, new
lauala, alike, all the same
leltja, an enemy
lelterama, the waning of the moon
lelgerama, to slide, to conquer
lebmerama, to refuse, to retract
lerama, to desire, to long for
lelgeranama, to crackle
lebmintjerama, to leave behind (property of one deceased)
lelama, to promise
lenkuelama, to adorn
lenkunjalilama, to adorn himself
lelingintama, to admonish
lena, this
lenkina, you, thou
lelba, stiff
lelka, smooth, even
lelta, half (moon)
lenkutja, lenkunja, } pretty, handsome
leoa, downward
lgurbma, foam
lgurbilama, to foam
lima, perhaps
linganginika, unruly
lira, none
lingiriuma, to press out
lingiuma, to plait
lilbalenkuelama, to give willingly
lilingerama, to boil
litna, the forehead
liorkna, a sucker on a tree
llanta, a vine of a creeper
llanterama, to creep (as vines)
lona, thick, broad
longa, far distant
longakalonga, far away from each other
loiloa, bad tasting
lola, the bottom
loatjira, a lizard
longura, the grass-tree
lora, grandmother
lodakama, to pick out
lolguma, to refuse, to reject
lowuma, to wipe out
lorilama, to water, to drink
loanilama, to stir
lolouma, to despise
louma, to wash
ltarbatuma, to clap with hands
ltarama, to crackle
ltalderama, to rot
ltirama, to wound
ltjumburknerama, to cease growing
ltarkalama, to rattle
ltarauma, to pinch, to twitch
ltirkna, healthy, bold, aloud
ltatjiltatja, one, alone
ltumba, able, skilful
ltirba, sorry, sad

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ltalba, lulbalulba, lumanamana, } full
ltalda, rotten
ltjanma, cray-fish
ltulba, the instep
lturkna, a crack
ltumba, skill, ability
lturkarauma, to foretell, to predict
lurra, not thirsty
luara, against
lutula, short
lubata, unwilling, obstinate
lunkura, diverse, different
luaela, intentional
lunbatunbata, surly, sulky
luma, to untie, to loose
luralama, to swell
lunga, shade, a hut
lupara, the upper part of the leg
lurkna, the veins, sinews
lurinja, a stranger
lurbaka, winter
luaila, intention
lukultmunta, misty rain
lutjula, lukuna, } there
lulilakalama, to go downward
lupatilama, to keep, to retain
lularatama, to become thick
lunkurilama, to penetrate, to distinguish
lunerama, to catch, to seize
lurkutankama, to slander
lupaterama, to sulk
luarerama, to turn himself to one
lurkninama, to charm
lunbatunbaterama, to grumble, to become sulky
luailerama, to intend
lurkneritjilama, to stop

M

mama, a wound
mana, bread, vegetable food
manga, flies
mandera, clothes
maia, makura, } mother,
mangabara, the ghosts of enemies deceased
mainama, to hold or keep fast
makerama, to spare, to avoid
makəralalbuma, to return unsuccful
mamilama, to wound
mangalima, to drive away flies
mankama, to grow
mankatjintama, to grow up
mankalerama, to get entangled
mankilama, to finish
mantilama, to shut, to close
marerama, to become good
marilama, to make good
maijinga, good, moral
makalaria, not good to eat or drink
makalaria, dangerous
mala, female
manta, closed, blunt, deaf
manka, finished
manderagata, with clothes, *i.e.*, clothed
mara, good
matia matitja, } entangled
mata (part.), full
matera, { ornament for the neck, light clouds
mbailitunkara nama, to kneel down
mbakama, to pull out
mbakarinama, to unite
mbakanama, to lean against
mbakatninama, to snap
mbakalama, to burst open
mbalilama, to act badly, to sin
mbangaralama, to double
mbanama, { to bear a child, to breed, to lay eggs
mbankama, to groan with pain
mbangarateriama, to make two single ones to pair
mbarkama, to shine
mbarama, to make, to feel
mbakata, open, clear of timber, bare
mbala, you two
mbāla, very bad
mballa, warm
mbanka, tough
mbarkinja, bright, shining
mbanja, matrimony
mbantika, a plain
mbala, sin, wrong
mbangara, a pair
mbalaka, summer
mbanjambanja, a mouse
mbenka, a flood
mbenja, a place
mbitjera, an owl
mburkagatilalama, to make visible, to reveal
mbenbalalbuma, to go or pass over
mbeltjerinama, to compare
mbeltjilama, to throw together
mbomberama, to nurse (sick ones)
mbenka, large (fire or water)

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mbogulba, short
mburkagatala, evident, open, visible
mbultja, innocent
mbobula, in the middle
mbola, the middle
mbobiputaputa, a multitude
mbultjama, diarrhœa
mbultjita, Capparis Mitchelli (tree)
mburka, the body
mitja, fire, firewood
molbamanalama, to wedge his way through
molbamainalilama, to wedge, press a thing through
monjamonijilama, to have pity
menta, sick, ill
monja, slowly
multitja, reeds
mulknura, worsted spun of hairs
murulunga, mononga, } Duboisia Hopwoodii ("pituri-" tree)

N

nama, grass
nanka, the chest
nankarakara, pain in the chest
nala, here
nalka, satisfied, no longer hungry
nangera, erect, straight
nana, this
natera, these two
nanankana, nanirbera, } these
nanta, an overloaded stomach
nakagata, so big
nalbatnauma, to invite, to press
naltanalterama, to meet, to see each other
naltauma, to throw on one heap
naltairima, naltanaltairima, } to see each other
namilama, namerama, } to alter, to change
namaneulama, to roll himself
nangeralalama, to soar (as birds)
nantalerama, to cease
nankalilama, to stamp with the feet
nangilindama, to turn oneself on the side during sleep
nanterama, to fill the belly
narguma, to press out
natalilania, natalatalilama, } to dissuade one
natama, to dislike
nurama, to rub out seeds
natata, a scorpion
nbanka, remained
nborba, slippery
nbunjala, back
nbata, a stalk of grass
ndolja, picture, likeness
ndolka, a fork, branch
ndolkarinama, to put across
ndardanama, to be silent
nealatnerama, to swear
nenterama, to understand
nenterama, to become distinct
nergama, to like, to be fond of
nentilama, to make known
nekua, father, thumb
nenta, strange, indistinct
nga, thou
ngalbanga, fresh, recovered, healthy
ngetjina, then, as, against
ngera, like, similar
ngualkna, with many branches, hairy, dense
nguanga, tame, peaceful
ngambakala, a domestic, a native
ngamara, the native pheasant
nganja, ngaroa, } a well
ngapa, a crow
ngira, a spot
nguanga, peace
ngumba, a hill
ngurangura, evening, afternoon
ngula, cool, pleasant, healthy
nguinba, to-morrow
nguinbarbuna, the day after to-morrow
nguna? who?
ngunatera? which two?
ngunirbera? which?
ngamiuma, to unfold
ngankalilama, to knock at the door
ngalbanga nama, ngalbanga lama, } to move or stretch oneself
nganelilama, to move, to turn anything
ngama, to carry
ngabitjauma, to turn, to roll something
ngakilkiuma, to contradict
ngetjima, to fetch, to bring
ngetjalbuma, to fetch or bring back
ngima, ngirima, Dual, } to beget
ngulerama, to become cool or pleasant
ngulilama, to make cool, pleasant, or healthy
ngurbmalilama, to think, to suppose
nilkna, secretly
nilknamba, a thief

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ninkarauma, to keep secret for himself
nilknalinama, to steal
ningalauma, to suffer
nimbatnama, to appoint, to decide
nintakanintilama, to separate, to divide
ninkierama, to become contented
ninterama, to meet
ninkea, contented
ningalkua, afraid
nintangara, once, one time
ninta, one
nitia, } a young man or woman unmarried
nitaia, the menses
njaua, a crumb of bread, soft black clay
njora, a bush fire
njakerama, } to weep, to deplore
ntauerama, }
njerama, to fish
njalbutawama, to throw, to hit unintentionally or by chance
njarerguma, to make a knot
njarkuma, to forbid
njualilalama, to justify himself
njuma, to drink
njualelama, to justify
njualelanama, to overtake (running)
nkanja, the point, dinner-time
nkanjarinja, a widower
nkala, rain-clouds
nkanjunta, a shower of rain
nkarba, others
nkuabera, corroborree of women
nkarknerama, to astonish
nkaualama, to ask for leave
nkarpauma, to turn anything round
nkelalanama, to offer for exchange
nkererilama, to undermine (water)
nkolanama, to give only good things
nkulbinkurilama, to get quite contented
nkenkalalbuma, to read
nkeabuna, a gift, a present
nkirkna, an angry one
nkarkna, excited
nkanjabuna, unmarried, single
nkarakara, not there
nkurkuturkuta, altogether, all of us
noa, husband, wife
noaitilja, } a married couple
noakatana, }
nonba, first
nota, the lap
nuarintjema, to stink
nunangerama, to thunder
nurknanarerama, to become stinking, to spoil
nulanulilama, to dash to pieces
nuralibama, to stop
numberama, } to stay away
nuatnama, }
numbilkera, forbearing, patient
nunkara, } this side
nunkarakwa, }
nura, quiet
numbaka right
nururka, the heel
murbma, resin
ntalbintalba, with many branches
ntanga, green bushes
ntalta, the rays of sun
ntaiuma, } to whore
nilkalindalama, }
ntankerama, to become healthy, to recover
ntalterama, to become a man, manly
ntaringama, } to follow
ntama, }
ntanjalerama, to give only bad things
ntarbatarinama, to separate
ntarbatariralama, to separate himself
ntarauma, to swing
ntarbukama, to tear off, to split
ntanterama, to watch
ntankama, to call
ntainama, to spear
ntaterama, to become quiet again after mourning
ntaramatarauma, to advise
ntatnama, } to have a belly-ache
ntaterama, }
ntalama, to accompany
ntangerama, } to dip in
ntangalama, }
ntankalelama, to save, to redeem
ntanka, healthy
ntatna, strong, powerful
ntakagata ? how big ?
ntaritja, calm (wind), quiet (water)
ntaginga ? how many ?
ntana ? where ?
ntananga ? whence ?
ntauna ? whither ?
ntoritja, ranges, steep
ntotnima, } to refuse eating,
ntotninama, } satisfied already
ntema, to give
nteelama, to light a fire
nteliuma, to flash, to lightning
ntitjalbuma, to give back, to return

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ntjalinama, to charm
ntjinama, to blow (wind)
ntjinanama, to go, to draw away (clouds)
ntjumalama, to go for good
ntjualilama, to follow
ntjilbutilama, to hit
ntjumala ntema, to give away, to make a present
ntjumara nama, to turn away from another one
ntjuma, to be in discord
ntjima, ntjilima, } to warm himself
ntjia, sweat
ntjabera, whole
ntjara, distinctly (speaking)
ntjuma, away
ntjelba, not sappy, dry
ntuaragala, farther away
nturkna, sad, sorry
ntuara, ntuarakwa, } other side
ntuarintjirka, through
ntualilama, to hit not, to miss
ntuana, yellow
nturantura, bad, ugly (face), angry
nturba, true
ntulta, steps on a ladder
ntulba, the hip
ntura, a split, crack
ntuma, to dance
ntutilama, to feed, to nourish
ntutjarauma, to announce
nturknerama, to become sorry
nturanturerama, to distort the face
nturbalilama, to confess
nturbankama, nturbilama, } to speak the truth
nturuma, to growl
ntutamea, food

O

ortja, ortjataka, } false, untrue
ortjalta, a lie, untruth
ortjerama, to lie
ortjerinarina, a liar
ortjibebilama, to deceive, to swindle
ortjitingerama, ortjitingilama, } to deceive, to disappoint
ortjitingilalama, to deceive oneself

P

parpa, quick
parpala, quickly
puta, hill, stone, mount
parama, to stop, to bar
palbaparama, to take away, to conquer, to subdue
putapalalama, to go incautiously or boldly
parempara, a bend of a creek

R

raba (suff.), without
raltutja, a clear distinct voice
ramalkura, all the same, alike
rambarknira, mad, furious, raging
raienkama, to breathe
railakaraila ntema, to give unequally
rakama, to take away
ralbarankama, to babble
ralibuma, to make heaps
rambarambatnanama, to wash away (water)
rangauma, to remit (punishment)
rantarkninkama, to sob, to hiccough
rauerilama, to separate himself
rauerama, to scatter
raualilama, to throw away, to sow
ratjilauma, to endeavour to do
rargua, the Pleiades (stars)
raga, the hand
rangiltja, accidental
ranjaranja, furious, wrathful, excited
raka, after
rarka, rirka, } bald, hairless
rata, short (speech)
rara, rukura, { easy, light
rarpa (suff.), self
renalama, to go thither
reknuma, to call
rerama, rilerama, } to get angry
relbukama, to pull away
rera, kangaroo
renta, about
reta, first, dumb
rilama, to let, to take care, to look about
rinjerama, to wish, to desire
rinjanama, to like
rinjerguma, to strangle
rinjulbmerama, to choke, to die by thirst
rinjalatnama, to send one away
riljinga, the twilight in the morning
rinja, the throat
rilera, tame, quiet, good
rilerarilera, harsh-, rough-voiced
rirtja, dry
rirtna, soft

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rinjintjirka, thirsty
riralama, to walk quickly
rirama, to shine
rirtjerama, to get dry
ririralbuntama, to run away
rolta, very angry
roamba, temperate, sober
roka, quiet
rorgama, rorginjama, } to make a noise
rokerama, to get quiet
rokilama, to make quiet
roralilama, to shake
rotna, the chin
rukutilama, to offer, to promise
rubulubulerama, to get dizzy
runtalkniuma, to shut, to forgive
rumerama, to appear
rumeritjalbuma, to appear again
rualima, to run (as water)
runkula, wise, accustomed
rula, wood
rurra, a room
rutjarutja, a large wooden tray

T

ta, tautara, I
taiinta, even, smooth
tamba, loose, shaking, perishable, fading
taltja, unripe, green, weak
talkina, fugitive
talambata, long (speech)
tana, there
tanja, long, tall
tarta, shallow, not deep
taringaringa, laughing, merry
taia, the moon
tagitja, a block of wood, the ribs
takera, the roots of plants and trees
talkua, a line, a sign
talua, the end
tantalinalina, a curtain
tangatanga, the cross bone
tailbelilama, to stumble
takalilama, to push on, to drive on
takalama, to tumble down through age
takerama, to be frightened sometimes
takiuma, to sow
takurindama, to lean against
talama, to shut out (water)
talakauma, to hear attentively
taluerama, taluilama, } to finish, to cease
talakerguma, to span, to tie round
taljilama, to reconciliate
taljawuma, to throw far away
tama, to crack with a whip
tambarkalama, to creep, to crawl
tanbilama, to offer for exchange
tangaparama, toaparama, } to encircle, to shut
tantama, to prick, to sew
tangutangilama, to change, mistake or relieve
tangitjatalama, topagama, } to shut in, surround or encircle
tangilama, to come before one
tangitjalama, to help, to assist
taraunjinama, to blow up or make up a fire
taratnama, to hang down
tarama, to laugh
tapinba, alive
taritjerama, to get calm (wind)
tatama, to glow
tataka, red, evening-red
tata, a spark
taua, a bag
taturatura, hell
teuma, to scrape, or scratch off
teelintama, to make afraid
teelabuljabula nama, to honour
terirama, to become afraid
terilkalama, telaelalama, } to flee, to run away
tekua, a rat
terilka, fright, fear
teelabuljabula, honour
terabalabalalama, to warn
telama, to show
tenama, to beget
tera, two
tentia, topata, } slanting
terba, pretty
tilirkilirka, all of us, at once
tinjauma, to inter, to bury
tmaiatuma, to ask, to consult
tmanjiratjalama, to haunt (ghosts)
tmatera, to get perplexed
tmapalalama, to swim
tjaba, worms, maggots
tjaia, a path
tjalbma, chips
tjalabalapa, the navel
tjalanka, resin
tjaka, the joint of bones
tjamalarelja, an honest one (trustworthy)
tjarita, a furrow, a deep track
tjata, a spear
tjata, a species of Hakea
tjatjera, companionship

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tjauarilja, the part of game given to the old men
tjakama, to kill, to throw fatally
tjanalilama, to lead or guide through
tjankala, at last
tjaka, loose, shaking
tjarunka, knowing, wise
tjarbinarinama, to make a heap
tjartjatuma, to correct, rectify or to confess
tjartjarinama, to pay a visit
tjartjagatilama, to agree with, to affirm
tjarinama, to draw, pull off, or pull
tjeba, a piece
tjebma, the ribs
tjekula, tjukukula, Cycas-palms (Encephalartos MacDonnelli)
tjelia, a small wooden tray
tjebakama, to break in pieces
tjenjama, to appoint
tjenkama, to appear (the souls of the deceased)
tjerama, to roast
tjeberama, to get broken
tjerentama, to exchange
tjikai (interj.), ah ! see !
tjibatjiba, zealous, industrious
tjikara, full of cracks
tjinba, familiar, intimate
tjiltja, soft, tender
tjimara, a row or line
tjimaralama, to go in one line
tjiberama, to look under or down
tjinbalama, to wait for one
tjinbalilama, to make intimate
tjinankilama, to reconciliate
tjinatnama, to twist together
tjina, tjilera, a friend, a mate
tjilera, white worsted
tjininga, property
tjintalbintaninja, full of abscesses
tjoa, meagre, poor, (also) boys
tjoerama, to get poor or meagre
tjontilama, to begin
tjontia, the beginning
tjora, the shin-bone
tjora, sunshine
tjoananga, twins
tjaiairima, to look out for the road
tjortjikama, to console, to comfort
tjubmara, the nail of fingers and toes, the claws of birds
tjumala, for ever as a present
tjunama, to lift, to lift up
tjurirama, to look at
tjurkmanterama, to get strong again, to recover
tjuerama, to heal
tjurankama, to rush or roar (as water)
tjurka, figs
tjulka, limestone
tjununkara, a sacrifice
tjurungara, corroboree
tjuta, porcupine grass
tmata, false
tmaina, perplexed
tmara, a camp
tmariltja, a native, a domestic
tmarankanja, the camp of the men
tmarankinja, an abandoned camp
tmaratmara, beetles
tmaranja, a question
tmanjinga, tmora, a stalk of grass
tmalabortja, the hip
tmulbura, the throat
tmura, dense, broad
tmurka, yesterday
tmurkarbuna, the day before yesterday
tnakuna, dirty
tnāgama, to part to divide
tnakama, to believe
tnama, to stand, stand up or get up
tnadangauma, to lift upon, to lift up
tnakalama, to rise in wrath
tnaritjerama, to be glad, to get merry
tnainama, to graze, to pasture, to watch
tnanbuma, to jump over, to jump
tnabuta nama, to be unchaste
tnabuta, rank, unchaste
tnatna, pitiful
tnara, the hind-part
tnainaninanina, a shepherd
tnalta, a path
tnadinga, stem of a tree
tnadinga, the lower part of anything
tnama, a pointed stick
tnanjama, to praise
tnanbutnanbulama, to jump (as a kangaroo)
tnauma, to drive away
tnauerama, to be discontented
tnakinjiuma, to part, to give each his part
tnaljama, to crush, to smash
tnanakatatuma, to knock to pieces, to crush seeds
tnatangauma, to help or assist

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tnerka, peaceable
tnerkarkerama, to dissuade
tnerenkama, to blame
tnenema, to hit fatally
tnetuanetnana, rheumatism
tnenka, a revenger
tnitimbuma, to be angry
tnitatalama, to curvet from joy or pain
tnitaumalanama, to counteract
tnilalama, to weep, to weep for
tnima, to weep
tninjarirama, to separate himself
tniritjerama, to hope
tnita, the belly
tnitjimba, voluntary
tnitemba, half full
tnoatnoa, rich
tnonta, pregnant with child
tnolba, intemperate
tnolkama, to get a fright
tnolkalilama, to cry for fright
tnoerama, tnoeranjama, } to lift the hand in beating
tnoirama, to aim at, to take aim
tnunmerama, to get faint by heat
tnumbarilama, to groan with pain
tnurinjilama, to foretell or predict
tnunta, a corner
tnuma, a cripple
tnuntintnunta, cornered, angular
topinba, alive
topinga, behind
toparinama, to put upon
topintjarinama, to skin, to cut off
torintama, to press on
topanama, tuakama, } to bend down, to stoop
tonkama, to draw (water)
toperama, toperanjama, } to turn round
topalealerama, to turn himself round
topangatopangilama, to fence
tolkinjalama, to walk about for nothing
toperanjalbuma, to come back
toparilama, to boast
tora, the land near creeks
topa, the back
topirka, the kidneys
topangatopa, a fence
tuedaguteda, far away from each other
tuatjatuatja, lazy, idle, slow
tutna, certain, true
tunka, short, thick
tuorala, the place of the ghost of enemies
tuatja, } the claw, the steps cut in the bark of trees in order to climb up them
tuma, to beat
turuma, to frighten
turinjilama, to make short
tuedinama, to change, to take a wrong one
tunama, to order, to command
tuailalama, to pay a visit
tungarilama, to announce, to threaten
tuelagama, to break the neck
turatura, short, low
tupa or tuatja, a valley or gorge
tukara, tmataka, } an ulcer or abscess
tuta, also, too, and

U

ulaialama, to disperse, to scatter
ulbara, the ears of cereals
ulbainja, a boomerang
ulbulbara, a sow-thistle
ulba, colour
ulbulbana, bats
ulbaia, creeks
ulbatja, ringneck parrot
ulbmara, a dust-storm
ulbarara nama, to hang up
ulburkninjatuma, to beat time (at a corroboree)
ulbma, narrow
ulbutia, exhausted
ulbuta, dirty, old, perished, bad
ulbutilama, to make bad or dirty, to damage
ulbuterama, to become bad or old
ulbelama, to dash in small pieces
ulbunjama, to pull off or out
uboljilama, to wither, to fade
uboljerama, fading, withering
ulerama, to hide away
ulelama, to increase
ultarbakabirka, coloured, gay-coloured
ultagulta, under water
ulta, hollow
ultargama, to break, to tear
ulta, the side, the front part
ultamba, honey
ultmunta, dust
ultunta, drops
ultmelama, to bring or drive together
ultuma, to cover
ultundikima, to drop
umba, to blister, to gall

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umbulara, the rainbow
una (prep.), in, on, to, into
unbuma, to send away or off
unbulama, to revoke, to leave
unkulunkulilama, to damage, to injure
unkualtjerama, unkualtjilama, to crumble, to moulder
unbantjainama, to smell bad, to stink
unba, stinking
unda, a clay-pan
unkuana, bones
unbulata, bitter, bad tasting
unka or enta, almost
unta, thou, you
unkwanga, thy, your
unbata, serious, earnest
unma, ripe, cooked, roasted, well-done
unkuanka, bloodthirsty
unkuala, sweet
unkulara, a valley
unbulara, a little whirl-wind
unkualtja, crumbs, small pieces
untama, to endeavour, to strive for
ura, fire, firewood
uranburanba, fiery, like fire
urubaruba, a big whirl-wind
urbia, a messenger
urara, an echo
urbula, black, dark, blue
urbutja, some
urbutjarbuna, some others
urunka, wise, learned, accustomed
urungara, also, too
urbanama, to sprinkle
urgarbuma, to prepare
urgultalawama, to flash, to lightning
urbmultjalama, to tumble down through age, to crush
urerinama, to go through between others
urenama, to disappear
ururinjaruralama, to go to and fro
uruntjama, to kiss
urunkuntema, to teach
urunkerama, to learn, to get accustomed
urknuerama, to rot
urkwarkerama, to destroy by fire
urumba, elder sister
urumbinjara, brothers and sisters
urkna, sap, a liquid
urana, a murderer
uruna, the James' Ranges
urbura, small magpie
urba, the backbone
urbina, seed-pods, a scar or mark
urumitja, wilderness, desert
uritjima, Mount Sonder
utnuma, to bite

W

wa, wabala, wakuia, yes, of course, certainly
wantai, wataka, certain
walbawalba, overheated
wara, only, without purpose
wantinja, sappy
watawara, slender, thin
wantama, to affirm
wabalilama, to assent, to consent
walama, to think, to suppose
wagama, to keep, to detain
wankama, to swell
wangerama, to grumble, to murmur
wanama, to blow (wind)
wanjalama, to lick
waritja, a hut
warka, a crumb of bread
wama, to throw
warentama, to borrow, to give for a time only
waratalama, to go in a line
watinjalama, to spot, to stain
watinjalilama, to stain himself
welgalilama, to bend
wedawedalama, to spy
wolanitjalbuma, to go to the assembly
wolatja, breasts of females
wola, a heap, a meeting or assembly
wolibuma, wolilama, to heap, to pile, to assemble
wolakama, to bark (as dogs)
wolakawalerama, to remember
wonjama, to suck out, to suck
wontama, to provide for
wonawonilama, to keep, to detain, to preserve
wotilberama, to prick up the ears (horses or dogs)
worinterama, to get strong again (after illness)
wolkna, a grave
wora, a boy
wóra, steam
wotna, wet, moist
woka, why
worinta, solid wood
wota, again, once more, more
wumbuma, to burn

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wunierama, to perish by thirst
wunia, mosquitoes
wunja, wunjinga, } aunt
wumbia, warmth, heat
wurinja, wind

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ADDENDA — terminations of time

nguntangunta, morning before sunrise
ngutnala, morning after sunrise
nkanjankanja, before noon
nkanja, noon
ngurangura, afternoon
alkneraka, evening
namaltalbutia, after sunset
lilika, now, directly
lata, now, to-day, soon
latakwaia, only for a little while
tmurka, yesterday
tmurkawaia, the day before yesterday
tumurkalkura, some days ago
imankatmurka, some time ago
imankakata, long time ago
imankaltjiranga mballa, from eternity
inguntawaia, the day after tomorrow
inguntalkura, in some days
ingunta anma, in a short time
ingunta arbarmaninja, in a long time
ingunta arbarbuka, in an uncertain time
etatjata, in eternity
rinba, long time ago
irolangala, a very long time
lata ngala, a short time
lata ntema, soon again

———o———

NAMES OF SNAKES INDIGENOUS IN CENTRAL AUSTRALIA.

NON-VENEMOUS. — Renina (carpet snake), knaringa, rata, inturkuna, latna, runburunga, ntadirka,

VENEMOUS.—Putamanina, ilumbalitnima, lalagalba, kelupa, kabaltaringa, ilbiralea, lalbalanana, elanjararantanina, erulangalanana, ntjurtja, baraloatjira.

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Contributions on the Fungal Flora of Australia.

By Professor Dr. F. Ludwig, of Greiz, Germany.

[Translated and communicated by J. G. O. Tepper, F.L.S.]

[Read December 2, 1890.]

I.—The Parasitic Fungi, classed as "Rusts" and "Smuts" (Uredineæ and Ustilagineæ).

The Rusts and Smuts belong to those moulds, which, on the one side, may be studied by the general public, but have special interest for the owner of a microscope on account of their diversity of forms; on the other side they enforce general recognition by infesting many flowering plants, notably those cultivated by farmers, gardeners, foresters, &c., which are sometimes not only seriously damaged by them, but wholly destroyed. The more complete knowledge of these moulds has led people in Europe to avoid much damage and loss in various instances. Thus the ordinary Corn Rust *(Puccinia graminis)* is decreasing since the Berberis-hedges are being removed from the neighbourhood of cornfields (upon these the Æcidium-generation is developed); plantations of conifers and fruit-trees remain both free from the attack of the rusts since they are being rigorously separated, because the *Gymnosporangium* species of the Coniferæ require the fruit-trees to complete upon them their Rœstelia-stage, and *vice versa*.

Another corn rust, *Puccinia rubigo-vera*, is also widely distributed in South Australia; its Æcidia develope upon Boraginaceous plants. It is therefore only necessary to discover the particular species in order to limit and prevent the spreading of the rust.

In this direction there are numerous other practical problems connecting themselves with this question, *which can only be solved with any certainty when the fungal flora of the respective country is approximately known.* This, as shown by the following List of known Australian Rusts and Smuts, is by no means yet the case. In this direction even the ordinary practical worker can render valuable assistance, also those scientific students who are actively engaged in other specialties could turn advantageously some of their attention to the fungi. In the interest of the elucidation of the fungus flora of South Australia, and of the later practical deductions that might be drawn from the results

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thus obtained, the members of the Royal Society are urgently requested to promote this work as much as lies in their power. If desired I will readily undertake with my mycological friends the identification of the collected material.

LIST OF AUSTRALIAN UREDINEÆ.

Of the Rust Fungi rather more than 1,200 species are known, and in a small district of Germany, containing a few square miles, several hundred species are to be found. From the whole of Australia only some thirty species, as enumerated here, are known.

For the sake of brevity, the three generations, Æcidium, Uredo, and Teleutospores, are indicated respectively by the Roman numerals I., II., III.

Uromyces vesiculosus, Wint.—On *Zygophyllum ammophilum*, II., III., Spencers' Gulf (Baron F. v. Mueller).

" **fusisporus**, Cke. et. Mass.—On *Acacia salicin* Melbourne (Baron F. v. Mueller), II., III.

" **digitatus**, Wint.—On *Acaia notabilis*, II., III., Gawler (J. G. O. Tepper).

" **Tepperianus**, Sacc.—On *Acacia salicina* and *A. myrtifolia*, III., Mount Lofty (Tepper).

" **Microtidis**, Cke.—On *Microtis porrifolia*, III., N. S. Wales.

" **Limosellæ**, Ludw.—On *Limosella aquatica*, I., III., Kangaroo Island (Tepper).

Puccinia graminis, Pers. (Corn Rust).—On *Avena sativa*, II., III., Melbourne (Reader), I. (Æcidium), not yet known from Australia, elsewhere on *Berberis* sp.

" **rubigo-vera**, D. C. (Red Rust), (I.), II., III. In Europe the Æcidium of this rust, which is very injurious to cereals (Rye and Barley), also develops upon Boragineæ (*Anchusa*, &c.); from Australia only II. and III. are known as yet, on *Poa annua* (Melbourne, Reader), *Alopecurus* (Coromby, Victoria, together with *Sclerospora macrospora*, Sacc.; Tepper), and wheat (all the colonies).

" **bullata** (Pers.), Schrœter.—On Umbelliferæ, I., II., III. In Europe also an enemy for cultivated plants, such as Celery, &c.

" **Prenanthidis** (Pers.), Fuchel.

" **rimosa** (Lk.), Wint.—On *Isolepis nodosa*, near Melbourne (Reader).

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Puccinia Lagenophoræ, Cke., I., II., III.—On *Lagenophora Billardieri*, at Omeo. The same plant is also attacked by a mildew fungus, viz., *Erysiphe (Dimerosporium) Ludwigianum*, Sacc. The Mount Lofty Ranges (Tepper).

" **Saccardoi**, Ludw., I., III.—On *Goodenia geniculata* (Tepper). To it belongs, doubtlessly, *Æcidium Goodeniacearum*, Berk.; on *Selliera radicans* (Reader). On plants of this order was also found another fungus, *Synthytrium Succisæ* (Tepper).

" **aucta**, Berk. et. Muell., I., III.—On *Lobelia anceps*, *L. pedunculata*, and *L. platycalyx*, Victoria.

" **Ludwigii**, Tepper, II., III.—On *Rumex Brownii*, Coromby, Victoria (Tepper).

" **Malvacearum**, Mont., III.—On different Malvaceous species (Reader, Tepper). This rust came first from Chili to Europe, and has been distributed over all continents, and everywhere injured the wild and cultivated mallows greatly, even eradicating them at some places.

" **Alyxiæ**, Cke., III.—On *Alyxia buxifolia*, near Brighton, Victoria (Campbell).

" **Berkeleyana**, De Toni, III.—On *Dichondra repens*.

Phragmidium Barnardi, Plow. et. Wint. (I.), II., III.—On *Rubus parvifolium*; Victoria (Barnard), S. Australia (Tepper).

" **Potentillæ** (Pers.), Wint., (I.), II., III.—On *Acæna Sanguisorbæ*, near Melbourne (Reader). The species of this genus, of which a number is known from all the other continents, occur only on Rosaceæ.

Melampsora Lini, Pers. (Flax rust).—On *Linum marginale*, &c., near Melbourne (Reader), Murray River (Tepper).

Uredo Clematidis, Berk.—On *Clematis microphylla*; Melbourne (Reader).

" **notabilis**, Ludw.—On *Acacia notabilis*; Roseworthy (Tepper). The Uredo spores of this rust, which deforms the phyllodia considerably, have been described and figured by me in the "Bot. Centralblatt," No. 27, 1890 (the cellular contents of the peduncle should be removed from the figure), and are distinguished by a very remarkable surface sculpture. They are covered

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by reticulations resembling the cells of bees, within which arise small rounded protuberances. The other stages of this and the other Uredo, Rœstelia, and Æcidium kinds have to be discovered yet.

Uredo armillata, Ludw.—On *Juncus pallidus,* near Coromby, Victoria (Tepper). It belongs to an unknown species of *Puccinia.*

" **angiosperma,** Thuem. — On *Hakea* (Baron F. v. Mueller).

" **Anguillariæ,** Cke.—On *Anguillaria dioica;* Upper Macquarie River (Hamilton).

" **Rhagodiæ,** Cke. et. Mass.—On *Rhagodia Billardieri* (Watt).

" **Spyridii,** Cke. et Mass.—On *Spyridium parvifolium* (Watt).

Rœstelia polita, Berk.—On *Muehlenbeckia Cunninghamii* and *Jacksonia scoparia.* Brisbane. Most probably belonging to some Gymnosporangium of some Cypress species.

Æcidium Cymbonoti, Thuem.—Victoria.

" **Ranunculacearum,** D.C.—The Crow's-foot Æcidia belong to various kinds of rusts affecting Gramineæ.

List of Australian Ustilagineæ.

Our knowledge of the Australian Smuts is not much better than that of the Rusts, for of about 400 known species of Ustilagineæ only the following 15 are known from Australia, some of which also are unwelcome guests to the agriculturist:—

Ustilago segetum (Bulliard), Wint. The common black smut of the cereals. On *Avena sativa;* Melbourne (Reader). On wheat, &c.

" **bromivora** (Tul.), Wint. On *Bromus mollis;* Melbourne (Reader).

" **solida,** Berk. On *Schœnus imberbis;* Melbourne (Reader).

" **utriculosa** (Nees), Winter. In the flowers of *Polygonum minus;* near Melbourne (Reader).

" **australis,** Cke. In the carpels of *Eriachne,* sp. (F. v. M.).

" **Muelleriana,** Thuem. In the seeds of *Juncus planifolius;* Victoria (Baron F. v. Mueller); Mount Lofty (Tepper).

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Ustilago Fimbristylis, Berk. In the seeds of *Fimbristylis*; Melbourne.

" **marmorata,** Berk. On the leaves of *Isolepis prolifera.*

" **Tepperi,** Ludw. In the stem and floral parts of *Amphipogon strictus* and *Neurachne alopecuroides*; Torrens Gorge and Highbury Scrub (Tepper).

Cintrastia axicola, Berk. In the grains and panicles of *Cyperus, Scirpus,* and *Fimbristylis.*

Doassantia punctiformis, Wint. On *Lythrum hyssopifolium*

Thecaphora globulifera, Berk. et Br. In the palea of *Leersia hexandra.*

Sorosporium Muellerianum. In the panicles of *Cladium filum.*

" **Eriachnis,** Thuem. In the spikes of *Eriachne.*

Cerebella Paspali, Cke. et Mass. On *Paspalus scrobiculatus.*

II. Parasitic Enemies of Eucalyptus and Acacias.

Among the fungi collected by Mr. Tepper during the last few years the parasitic enemies of Eucalypts and Acacias are remarkably numerous. They have been partly identified by me, partly by Messrs. Winter and Saccardo at my request. They are the following:—

A. *Enemies of Eucalypts.*

Polyporus Eucalyptorum, Fr.

Hexagona durissima, Berk. On *E. obliqua.*

Poria mollusca, Fr. On *E. obliqua.*

" **obliqua,** Fr.

Polystictus cinnamomeus, Jacq.

Ceriomyces incomptus, Sacc., *n. sp.* Conidia-form of a *Polyporus.*

Crepidotus haustellaris, Fr. On *E. viminalis.*

Panus lateritius, Sacc.

Stereum fasciatum, Schr.

" **cyathiforme,** var. *minor,* Sacc.

Xylopodium australe, Berk. On *E. hemiphloia*; Victoria.

Rhamphoria tenella, Sacc., *n. sp.* On *E. viminalis.*

Comarosporium Eucalypti, Wint.

Physarum album, Fr.

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B. *Enemies of Acacia.*

Phyllosticta phyllodiorum, Sacc., *n. sp.*
Septoria phyllodiorum, Sacc., *n. sp.*
Uromyces digitatus, Wint.
" **(Pileolaria) Tepperianus,** Sacc.
Uredo notabilis, Ludw., *n. sp.*
Capnodium elongatum, Berk. et Cke.
Stereum hirsutum (W.), Fr.
" **Kalchbrenneri,** Sacc.

III. On the Position of Clathrus (Ileodictyon) Tepperianus, *Ludw.*

Since I published the description of a species differing from all forms of *Clathrus* hitherto known under the above name (Bot. Centralblatt, Nov. 27, 1890), a larger work of one of the best authorities in respect of the Phalloideæ has appeared ("Untersuchungen zur vergleichenden Entwichlungsgeschichte und Systematik der Phalloideen," von Dr. E. Fischer, in Denkschriften d. Schw. Naturf. Gesellsch., vol. 32, part I., 1890). In this work the distinguished mycologist reduces several hitherto separate kinds into wider species. This he does also with the hitherto distinct species of *Clathrus (Ileodictyon) cibarius* (Tul.), Fischer, (with transversely ridged branches), and *Clathrus gracilis* (Berk.), Schlecht (branches delicate and smooth). With the union of these two species the independence of *C. Tepperianus* would also cease, as the latter stands between the two former. It resembles *C. cibarius* in the dimensions and the breadth of the reticulating branches, and approaches the *C. gracilis*-type by their smoothness, but does not nearly reach the dimensions of some species in the London and Paris collections. From the standpoint of Dr. Fischer the three hitherto recognised species, *C. cibarius, C. Tepperianus,* and *C. gracilis,* would have to be united under the name *C. cibarius* (Tul.), Ed. Fischer. Herr Fischer, however, writes to me :—"To be quite sure in the union of these species, all the connecting links of the series should certainly be before me, at least in the form of spirit specimens, and even then it would not be certain whether these different forms were individual variations or constant varieties. Only observations in the respective localities or artificial cultivation can decide this point."

To initiate and encourage such observations and cultural experiments *in loco* has been the motive for the above remarks.

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Remarks on Photographing the Solar Eclipse of 12th December, 1890.

By D. B. Adamson.

[Read February 3, 1891]

I lay before you to-night some photo-negatives of the late solar eclipse, also a photographic enlargement of one of the same. The instrument used in taking them being a Newtonian reflector of 12½ in. aperture. Although with this instrument (when armed with the solar diagonal and dark glass) we can gaze on the sun's disc very comfortably, I found that a further reduction of the light would be required for the purpose of photography. Knowing that eclipses do not wait for any one, I set about making preparations and experiments a week before hand. My first attempt was with a diminished aperture and a very short exposure (one which might almost be termed instantaneous), using a common dry plate. On developing this I was somewhat surprised to find that on the centre of the plate (where a black disc should have been) there was only a circle of clear glass more transparent than the surrounding parts of the plate, the gelatine having quite disappeared from the exposed part. My next idea was to remove the silver from the face of the small speculum (having spare ones), and to place behind this a piece of black woollen cloth, in hopes of reducing, if not altogether getting rid of, the double reflection. I found that this gave a very cool reflection, but still so distinctly double that it was of no use for my purpose, so I replaced the small silvered speculum. I next removed the silver from the large speculum (having a duplicate of same), leaving only the bare glass to give the reflection, and by reducing the aperture of the telescope to seven inches, I succeeded in producing the photos as you see them. Although the slowest dry plates were used, and the exposure was almost instantaneous (being the time occupied by a one and three-quarter inch hole in a slide falling past a similar hole at the focus of the telescope), still it was too long, but by using a very weak developer the photos came out fairly sharp. My plan of procedure was in the first place to watch for the first contact, which took place at 11 h. 21 m. 3 s. a.m. This was very sharp and clear, the atmosphere being fairly steady. I next gave my attention to photographing, taking five negatives at various stages of the eclipse, my desire being to obtain one as nearly central as possible. This,

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I thought, would be a permanent and measurable record of the quantity of the eclipse for future reference. Having obtained the negatives, the next thing was to watch for the final contact. Not only was the sun's image less steady at this period, but also an alarm of fire somewhat disturbed the observation, so that it was not so certain as the first, still I do not think it can be more than two seconds out. The final contact took place at 1 h. 54 m. 30 s. p.m. By these times of first and final contact I find that the second photo I took at 12 h. 36 m. 4 s. was 1 m. 42·5 s. earlier than the centre of the eclipse, but the nearest thereto. From this I have made a photographic enlargement, six and a-half inches in diameter. By applying the accompanying scale of hundredths to this photo, we see at once that the encroachment or overlapping measures 40·5 hundredths. Allowing for the photo not being exactly central, a very small amount should, of course, be added. Being so near the centre of the eclipse, the advance made would be very small (not more than half one of the divisions of the scale), so that the whole amount of the obscuration may fairly be set down as 41 hundredths of the sun's diameter. As proof of this, it may be added that the third negative, taken at 12 h. 40 m. (being 2 m. 13·5 s. later than the centre of the eclipse), measures just perceptably less than the former. It may be stated as a proof of the absence of anything in the way of distortion that the photos taken previous to the eclipse are perfectly circular. The enlargement is so sharp that on close examination some of the protuberances on the moon's limb can be readily distinguished.

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Description of a New Species of Cossus.

By J. G. O. Tepper, F.L.S.

[Read February 3, 1891.]

Plate I.

Cossus Edwardsi, spec. nov. Female. Dark blackish grey. Palpi prominent, reflexed, underside white, upper black. Eyes grey, with irregular black patches. Antennæ setaceous, narrowly white above, remainder dark greyish brown; basal joint very stout, as long as five or six of the next put together, the two following about half the diameter of the first, rapidly tapering; remainder very short, and very gradually tapering to a fine point at apex. Face blackish, a patch of scales above the palpi, and the hair-like scales around the base of antennæ whitish. Prothorax dark blackish grey; in front a patch of long black scales, intermixed with a few white ones. Mesothorax broadly bordered in front, and laterally by long white hairs, blackish behind. Metathorax blackish, broadly white laterally, narrowly behind. Abdomen dark blackish grey, with some very narrow paler bands above, a broad pale stripe laterally, white when adjoining the dark brown, pale bordered, very glossy ventral plates, the last two segments covered with dense white down underneath. Wings blackish, margins and border grey, the latter with very devious inner boundary on the forewings. Forewings between subcostal and median vein, with three roundish spots, rather large, the middle one largest, and separated into two very unequal parts by a dark cuneiform line; a large round white spot in the middle of the disk below the median vein; a small whitish spot between the apical branches of the latter. Hindwings, the costa, and the space overlapped by the forewings white, remainder dark brownish grey. Veins dark brown, much more curved than in *C. cinereus*. Fringe very narrow, pale. Underside of thorax and legs covered with dense whitish down, the forewings clouded lighter and darker, most of the markings of the upper side visible below; subcostal and median veins bordered broadly by long bluish-white hairs for about two-thirds of the length; space beyond anal vein silvery white; hindwings have the costa partly and narrowly white, remainder ashy grey. Length of body, $2\frac{3}{4}$ inches; span of wings, $6\frac{1}{3}$ inch.

The species differs from the common *Cossus cinereus* in much

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darker colour, the characteristic and promiscuously spotted fore-wings, and the different curvatures of the veins.

A single specimen was received through Mr. G. E. Edwards, from Windsor, near Adelaide, on December 5, 1888, no other having been seen previously by me or other collectors, to whom I have shown it. Mr. Hy. Edwards, a noted Lepidopterologist of the United States America, who visited Adelaide last year, has studied this and its allied family specially, and has lately written me that he cannot find anything at all resembling this species among described ones. It is hereby dedicated to him and the finder conjointly.

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Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read April 7, 1891.]

IX.

CARABIDÆ.

HYPHARPAX.

H. Sloanei, sp. nov. Minus elongatus; viridi-æneus; antennis (his apicem versus vix infuscatis), palpis, mandibulis (his basi apiceque piceis), pedibus (femoribus leviter infuscatis), elytrorum margine tenui, et abdominis apice, testaceis; prothorace fortiter transverso, postice quam antice vix latiori, postice utrinque foveolato, foveolis vix perspicue punctulatis, lateribus modice rotundatis, angulis posticis obtusis vix rotundatis, latitudine majori vix ante medium posita; elytris fortiter striatis, interstitiis subconvexis postice haud magis elevatis, 3° prope apicem puncto setifero instructo.

Maris tarsis anterioribus 4 fortiter dilatatis, intermediorum articulo 1° subtus simplici; femoribus posticis subtus late angulatis (vix dentatis); tibiis posticis leviter arcuatis. Long, 3 l.; lat. $1\frac{1}{10}$ l.

From the other species of *Hypharpax*, not greatly larger than it, the present species may be known by the combination of the following characters:—Legs entirely pallid (the femora only a little brownish), elytra strongly striated (almost as strongly as in *H. ranula*, Cast.); anterior 4 tarsi of male very strongly dilated (about as strongly as in *H. inornatus*, Germ.); posterior femora of male only widely and obtusely angulated in place of the strong tooth found in *H. inornatus*, *vilis*, &c.; posterior tibiæ of male regularly and only slightly curved, not bent inwards strongly near the apex. Perhaps the strong striation of the elytra is the best single character. The prothorax is almost as in *H. inornatus*, Germ., as also are the hind tarsi.

N.S. Wales; taken near Mulwala by Mr. T. G. Sloane.

DICROCHILE.

D. ventralis, sp. nov. Sat elongata; minus convexa; sat nitida (mas) vel subopaca (femina); nigra vix ænescens; antennis palpis tarsisque plus minus picescentibus; prothorace quam

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longiori vix tertia parte latiori, quam caput vix latiori, canaliculato, obscure transversim rugato, lateribus minus late reflexis ante medium subangulatis ante angulos posticos sinuatis, his obtusis sat distinctis; elytris striatis, interstitiis sat planis (nihilominus 3° 5° 7° que apicem versus carinatis, 3° mox ante apicem externe abrupte angulatim dilatato), 3° punctis 2 vel 3 instructo.

Maris segmentis ventralibus 3-5 in medio sat crasse transversim rugatis vel squamoso-punctulatis et setis pallidis obsitis. Long., 7 l.; lat., 3 l.

The sides of the prothorax very distinctly sinuate behind (and angular before) the middle, together with the peculiar sculpture of the elytral interstices posteriorly, render this a very distinct species. The prothorax is scarcely more than half as wide as the elytra. The peculiar external angulation of the hind part of the third elytral interstice is best observed by looking along the elytra with the head of the insect directed towards the observer when it is very conspicuous. Compared with *D. Goryi*, Boisd. (apart from colour and the very different shape and proportions of the prothorax), this species has the prothorax obscurely roughened with fine puncturation (where in *Goryi* it is strongly rugulose), much less widely margined, &c.; the elytral interstices much less convex and very differently formed at the apex; also the ventral segments of the male much less nitid and having all the middle part sculptured and setiferous (in *Goryi* there is an irregular line of setiferous rugulosities on either side of the middle line). Of other previously described species *gigas*, Cast., *punctipennis*, Cast., and *quadricollis*, Cast., are *inter alia* much larger, *punctato-striata*, Cast., has elytral striæ strongly punctured, *montana*, Cast., has the prothorax "short and transverse," *minuta*, Cast., is much smaller than the present species, and *brevicollis*, Chaud., has the prothorax even more transverse than *D. Goryi*.

S.A.; near Port Lincoln.

HYDROPHILIDÆ.

PARACYMUS.

P. nigerrimus, sp. nov. Breviter ovalis; convexus; nitidus; niger, nullo modo metallescens; antennis (clava excepta) prothoracis lateribus pedibus elytrorumque apice rufescentibus; corpore supra sublævi-elytris sub lente forti vix perspicue punctulatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{3}{5}$ l.

The complete absence of sculpture—except the sutural stria of the elytra which is obsolete in front—will distinguish this species from all its known allies. Unfortunately, I have not been able

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to spare a specimen for dissection, without which it is impossible to be sure of all the structural characters, but I think there is no doubt of its being closely allied to *Paracymus (Paranacœna) Lindi*, Blackb., and *sublineatus*, Blackb., of which it has quite the facies, and the structural characters so far as I have been able to examine them.

Mountains of Victoria.

LACCOBIUS.

The following species may, I think, be attributed to this genus (not previously recorded as Australian so far as I know), although they differ from the European members of it in having maxillary palpi somewhat more robust, the labrum shorter, the mesosternum tuberculated (not sharply carinated) in front of the middle coxæ, and the tibiæ set with short stiff erect bristles. In general appearance, sculpture, &c., they resemble the European *L. minutus*, Linn., but are a little more elongate in form. The distinctive characters mentioned above might justify a new generic name, but I am satisfied that for the present it is better to minimise genera, and so should be disposed to attribute to *Laccobius* all species belonging to *Hydrobiides* (Lacordaire), and having eight-jointed antennæ, tibiæ devoid of swimming-hairs, prothorax and ventral segments of the *Hydrobius*-type, and facies style of sculpture, &c., resembling the European *Laccobii*. *Hydatotrephis* differs *inter alia* in having the last joint of the maxillary palpi not longer than the penultimate, but in some characters comes near *Laccobius*.

L. montanus, sp. nov. Sat late ovalis; sat nitidus; brunneo-piceus; antennis (clava excepta), palpis (apice summo excepto), clypeo, prothorace, pedibusque dilutioribus vel testaceis; supra crebre æqualiter sat aspere punctulatus; elytris leviter striatis; prothorace fortiter transverso, antice fortiter emarginato, lateribus sub-diaphanis, angulis omnibus rotundatis. Long., $1\frac{3}{4}$ l.; lat., $\frac{4}{5}$ l.

The texture of the lateral portions of the prothorax is so thin that these parts are transparent; the prothorax is very much wider across the base than in front (though the hind angles are so entirely rounded off that there is no clear distinction between the sides and the base; the sides and apex of the elytra are paler in colour than the disc. Compared with the European *L. minutus*, Linn., this species is throughout much more closely and evenly punctured, the puncturation being moreover scarcely so strong as that on the prothorax of *L. minutus*.

Victorian mountains.

L. australis, sp. nov. Præcedenti affinis; differt statura minore, prothorace in medio infuscato, hoc et capite multo sparsius

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nec aspere punctulatis, elytris magis perspicue striatis, striis quam interstitia magis fortiter punctulatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{7}{10}$ l.

I have no doubt this is a good species, although very close to the preceding. In *L. montanus* the puncturation of the whole upper surface is very equal and quite asperate, being so evenly distributed on the elytra as to include the punctures of the striæ, and make these latter quite confused with those of the interstices. In the present species the puncturation of the head and prothorax (especially the latter) is much finer and less close than that of the elytra, while on the elytra the puncturation of the striæ is quite noticeably distinct from that of the general surface.

Victoria; Ovens River.

CERCYON.

C. flavipes, Fab. I have recently taken this species (at any rate, I cannot find any character to justify regarding it as distinct) at an elevation of about 5,000 feet above the sea, on the Victorian Mountains.

PAUSSIDÆ.

PAUSSUS.

P. australis. Sat angustus; sat opacus; obscure rugulose (præsertim in elytris) punctulatus; ferrugineo-rufus; elytris fascia lata nigra ornatis; antennarum articulo 1° elongato-piriformi, 2° quam 1us duplo longiori et duplo latiori difforme (ad basin truncato, ad apicem rotundato, supra in parte basali concavo in parte apicali fortiter convexo); prothorace in medio valde strangulato, parte antica fortiter transversa postice bifida, parte postica minus fortiter transversa supra profunde late longitudinaliter sulcata. Long., 2 l.; lat., $\frac{7}{10}$ l.

The dark fascia on the elytra is at its widest near the lateral margin which it does not quite reach; thence it narrows a little towards the suture, where its width is nearly half the length of the whole suture, its hind extremity being distant from the apex about a fifth of the length of the whole suture. This species is interesting as being the first genuine *Paussus* recorded from Australia.

Queensland; Mt. Bartle Frere; presented to me by C. French, Esq.

STAPHYLINIDÆ.

TACHINUS.

T. novitius, sp. nov. Sat nitidus; ferrugineus; antennis (apicem versus) elytris (parte postica præsertim) meso- et meta-sternis abdomineque infuscatis; elytris prothorace fere duplo longioribus; capite prothoraceque lævibus; elytris sparsim sat subtiliter, abdomine crebre minus subtiliter, punctulatis. Long., $2\frac{1}{5}$ l.; lat., $\frac{4}{5}$ l.

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In the male the anterior tarsi are rather strongly dilated, on the upper surface the apical segment of the hind body ends in four sharp teeth, and on the under surface the penultimate segment of the hind body is sinuous or feebly emarginate in the middle and the apical segment is very deeply incised (the middle of the incision being convex hindward), both these segments having a conspicuous pencil of long ciliæ on either side.

I hesitate a little as to whether this species should be referred to *Tachinus* or *Tachinoderus*. The principal distinctions between the two (I know *Tachinoderus* only by description) appears to be that the latter has the mesosternum carinate and the hind body margined only at the base, while the mesosternum of the former is simple and the entire hind body strongly margined. In the present insect the mesosternum is not quite so evenly rounded as in the European *Tachini*, but certainly cannot be called carinate, and the hind body has an entire margin, but it is very much narrower than in the European *Tachini*. The mouth organs seem to agree in all respects with those of *Tachinus*; these, however, are described as being similar in *Tachinoderus* also.

In order to compare this species with some well-known one, I place it beside a specimen of the European *T. marginellus*, Fab. (which Mr. Olliffe reports from Sydney; probably introduced), and find that besides the structural distinctions mentioned above, it differs in its elytra being somewhat longer in proportion, its prothorax and head almost lævigate (under a high power some sparse very fine puncturation can be detected), its elytra with puncturation much more sparse and feebly impressed with a longitudinal depression on either side of the suture, making the latter appear carinate, and with the apex evidently more rounded, and the puncturation of its hind body decidedly stronger with a more or less longitudinal arrangement giving the appearance somewhat of longitudinal wrinkles.

Mountains of Victoria; a single example imbedded in snow.

HETEROTHOPS.

H. taurus, Blackb. I find that I was in error in referring this species to *Heterothops*. An examination of its prothoracic stigmata has satisfied me that it is a *Quedius*, and should stand near *Q. hybridus*, Er. The short acutely-pointed apical joint of the maxillary palpi misled me, but now, knowing the species to be a *Quedius*, I can see that even those organs are not really inconsistent. From *Q. hybridus* it may be distinguished *inter alia* by its antennæ entirely red.

QUEDIUS.

Q. cuprinus, Fauv. (var.? *Baldiensis*). Sat dense subtiliter fulvo-pubescens; piceus; antennis basi et apice, ore, pedi-

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busque testaceis: elytris subœneis, basi suturaque obscure testaceis; abdomine subirideo, apice cupreo-testaceo; antennis sat robustis, articulis nullis transversis; capite elongato angusto subparallelo, oculis parvis vix convexis; prothorace quam longiori vix latiori, antice fortiter angustato, angulis posticis cum basi omnino rotundatis, puncturis usitatis notatis; scutello elytrisque (his prothorace vix longioribus) leviter squamose sat crebre, abdomine sparsim crassius, punctulatis. Long., $2\frac{1}{5}$ l.; lat., $\frac{3}{5}$ l. (vix).

In M. Fauvel's tabulation of the Australian *Quedii* (Ann. Mus. Gen., 1877, p. 268) the present species would fall under "B" (along with *Q. æneus* and *cuprinus*) on account of the narrow elongate form of its head. It is much smaller than either of those species, and *inter alia* differs also from the former of them by the sparse puncturation of its hind body, and from the latter by the testaceous apical joints of its antennæ and the rounded-off hind angles of its prothorax. It is to be noted that the apical joint of the maxillary palpi in this species is slender, very acute at the apex, and much longer than the penultimate joint. In spite of these differences, however, it seems to me not improbable that this is a small Alpine var. of *Q. cuprinus*, and I have given expression to this opinion by recording it as above.

Mountains of Victoria; a single example in moss at an elevation of about 5,000 feet above the sea.

HYPEROMMA.

During a recent visit to the Victorian Alps I was fortunate in securing two examples (male and female), which evidently belong to this remarkable genus (previously known only, I believe, by a unique male example from King George's Sound), and which M. Fauvel describes as sharing with only two other genera of *Staphylinidæ* the singular character of having the eyes placed on the upper surface of the head. I cannot doubt that these two examples are identical specifically, although the differences (all sexual, I believe) are considerable, and I am not absolutely certain that they were taken in company. The species seems to be extremely close to the typical one (*H. lacertinum*, Fvl.), but the sexual characters of the male forbid its being regarded as identical unless on the supposition that M. Fauvel was mistaken as to the sex of the specimen he described. This, however, appears to me sufficiently probable to render it inexpedient to give a distinctive name to the species before me, and I shall therefore offer the following as probably merely a correction of the sexual characters assigned to M. Fauvel's species. I cannot find any tangible specific character in which the insects before me do not satisfactorily agree with the very full and clearly-expressed description

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of *H. lacertinum*, although the *colour* is not quite identical. M. Fauvel says (Ann. Mus. Gen., 1878, p. 68), "obscure rubrum, abdomine piceo." In one of my examples the head is nearly black, while the prothorax and elytra are reddish; in the other the head and elytra are red, while the prothorax is nearly black; but I do not attach any importance to these differences.

H. lacertinum, Fauv.? Mas. Capite latiori; tarsis anticis *L* fortiter dilatatis; segmento ventrali apicali profunde triangulariter anguste inciso, penultimo in medio profunde subrotundatim foveato; supra segmentis 2-4 in medio longitudinaliter leviter canaliculato, segmento apicali postice sat angustato.

Femina. Capite minus lato; tarsis anticis vix dilatatis; segmento ventrali apicali postice sat angustato fere ut maris inciso, penultimo simplici; supra segmentis haud canaliculatis, segmento apicali postice sat lato.

LATHROBIUM.

L. Victoriense, sp. nov. Depressum; sat robustum; sat nitidum; parce pilosum; piceo-rufum; abdomine (apice excepto) obscuriori, antennis palpis elytris pedibusque testaceis; capite a basi antrorsum angustato, quam prothorax haud latiori, sat fortiter sat sparsim (postice et latera versus magis crebre) punctulato; prothorace quam latiori parum longiori, postice haud angustato, utrinque sat fortiter minus crebre punctulato, angulis omnibus sat rotundatis, lateribus subconcavis; elytris prothorace sat latioribus, tertia parte longioribus, leviter obscure punctulato-striatis; abdomine crebre subtilissime (apicem versus minus crebre) punctulato; antennis elongatis. Long., $2\frac{3}{5}$ l.; lat., $\frac{1}{2}$ l.

This species is no doubt near *L. gratellum*, Fvl., described on a unique male from Sydney. Even if the insect before me should prove to be the female of that species, it is sufficiently remarkable in colour to be regarded as an Alpine form deserving a name; it is not likely, however, that such is the case, for, apart from colour, it differs in the head being narrower as compared with the prothorax, and triangular rather than quadrate; in the prothorax not being narrowed hindward (except, of course, close to the base, where the sides round off into the base), and I should judge in the stronger puncturation of the prothorax, which in *gratellum* seems to be finer than that of the head; whereas in the example before me the puncturation of the head and prothorax seems to be very similar in character. I hardly know where to place the present species in M. Fauvel's tabulation of the Australian *Lathrobia* (Ann. Mus. Gen., 1877 and 1878), as its tarsal structure would associate it with the group called "I.," while all

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the species with the head at its widest close to the base fall in the group called "II."

Mountains of Victoria.

PÆDERUS.

P. Meyricki, spec. nov. Apterus; nullo modo parallelus; niger; prothorace rufo, elytris cyaneis; oculis parvis; elytris basin versus angustatis, prothorace haud longioribus; abdomine retrorsum sat dilatato; cætera fere ut *P. cruenticollis*, Germ. Long., $3\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

The insect is at its widest across the hind body. The smallness of the eyes will at once separate it from the various forms of *P. cruenticollis*; the difference of size may be stated thus—in *cruenticollis* the hindmost point of the eye is about equidistant between the front of the same and the point where the lateral margin (or base) of the head is in contact with the neck, while in the present species the hindmost point of the eye is very distinctly nearer to the same than to the neck. I am a little doubtful whether this may not be the apterous insect which M. Fauvel (Ann. Mus. Gen., 1878, p. 516) mentions as a var. of *cruenticollis*, but if so I think that learned entomologist must have overlooked the difference in the size of the eye.

W. Australia; taken in 1886 by Mr. Meyrick.

P. cruenticollis, Germ. In November last year I found this species in countless thousands crawling over the snow on some of the highest peaks of the Australian Alps.

LITHOCHARIS.

L. varicornis, sp. nov. Sat robusta; parallela; pilis erectis sparsim vestita; minus nitida; picea, elytrorum sutura rufescenti, antennarum basi et apice prothorace abdominis apice pedibusque rufis; crebre subtilissime punctulata; elytris prothorace vix longioribus. Long., $1\frac{4}{5}$ l.; lat., $\frac{3}{10}$ l.

Not unlike the European *L. brunnea*, Er., in build, but with very much finer and closer puncturation and somewhat longer elytra; the head is shorter than in that species, being a little shorter than the prothorax. Joints 3—7 of the antennæ are nearly black. The short series before me appears to be of one sex only—female.

Victorian Alps; among dead leaves.

SCOPÆUS.

S. ruficollis, Fvl. This is really an undescribed species, as its author merely points out in what respects it differs from the European *S. Erichsoni*, Kolen. I have a *Scopæus* from the Alpine district of Victoria which may be it, or may not—the latter is more probable, since Queensland is said to be the habitat

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of *S. ruficollis;* but it is impossible to be certain on the point. The description, however, is so deplorably useless that I think something will be gained by this Victorian form being described, even at the risk of its proving, sooner or later, to be identical with the Queensland one; I am unable to specify any very precise difference between the two forms, except that the specimen before me is a little smaller than *S. ruficollis* is stated to be, and that the elytra do not seem to be "shorter than those of *S. Erichsoni*," which (according to Dr. Kraatz) are "not quite a third longer than the prothorax." I do not possess a type of *S. Erichsoni*, the habitat of which is thus stated by Dr. Kraatz, "(Occurs) rarely in Central and Southern Germany." Some named forms occurring in France and Italy are recorded by Dr. Kraatz as varieties of *Erichsoni*.

S. dubius, sp. nov. Subnitidus; minus depressus; pube subtilissima vestitus; piceus, antennis prothorace abdominis apice elytrisque obscure rufis (his apicem versus dilutioribus), pedibus testaceis; alutaceus, vix manifeste punctulatus; capite quadrato, prothorace latiori; hoc oblongo, basi manifeste biimpresso, supra linea mediana obsoleta sat nitida instructo; elytris prothorace latioribus, tertia parte longioribus. Long., $1\frac{3}{5}$ l.; lat., $\frac{3}{10}$ l.

That part of the head which would be cut off behind a straight line passing across the front of the eyes is as nearly as possible an exact square—though with the angles of the said square ronnded. None of the joints of the antennæ are transverse.

Besides *S. ruficollis*, Fvl., *S. digitalis*, Fvl. and *latebricola*, Blackb. have been described from Australia; of these the former has blackish or piceous tibiæ, and the latter is a smaller and less nitid insect with a longer head, &c.

S. obscuripennis, sp. nov. Minus nitidus; minus depressus; pube sat subtili vestitus; piceus, antennis palpis prothorace abdominis apice elytrorum apice pedibusque plus minus rufis vel rufescentibus; crebre subtilissime fere asperatim punctulatus; capite sat quadrato, quam prothorax parum latiori; hoc oblongo, basi subfortiter biimpresso, inter impressiones fere carinato, linea mediana elevata haud lævi vix manifeste notato; elytris prothorace parum latioribus, hoc nullo modo longioribus. Long., $1\frac{3}{5}$ l.; lat., $\frac{3}{10}$ l. (vix).

Very distinct from the preceding, on account of its much shorter elytra and decidedly more defined puncturation; the antennæ and tarsi, moreover, seem to be a little stouter, and the general appearance is duller and more obscure. The colours vary a little, the lighter parts in some examples being more decidedly red than in other examples; in some the elytra are of a nearly

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uniform dark-brown tint, while in others they have a wider and rather conspicuous dark-red hind border; the distinctness of the red margin of the elytra usually seems to vary according to the light in which the specimen is held. The legs are of a pale-brown colour (very different from the decided testaceous tone of the same in *S. dubius*), the femora sometimes more or less infuscate. In the male the third ventral segment is a little flattened in the middle of its hinder part, the fourth bears a semicircular fovea, the fifth is widely and shallowly concave in its whole length, and the sixth is widely and sinuately emarginate behind.

The present species would seem to differ from *S. ruficollis*, Fvl., in having shorter elytra, and probably in various other characters. From *S. digitalis*, Fvl., it appears to differ *inter alia* by its tibiæ being of uniformly light colour. *S. latebricola*, Blackb., is a smaller and narrower insect* with longer elytra.

Victoria; near Wandiligong, among dead leaves.

DOMENE.

I am perhaps running some risk in referring the following species to this genus, as I have not seen M. Fauvel's diagnosis of its characters,—but from its place in that learned author's tabulation of the Australian *Pæderid* genera and from references to *Domene* in other memoirs, as well as from the close resemblance of this insect to *D. Australiæ* as described by M. Fauvel, I think I am not far wrong; at any rate there is no other genus known as Australian to which the present species can be referred. Having only a single specimen, I have been unable to examine its mouth organs fully; but the following are its principal characters (some of which may be sexual) as far as they can be seen without dissection:—antennæ short, stout, of the *Lathrobium* type; head and prothorax almost as in *Scopæus;* anterior femora armed with a distinct (though not strongly developed) tooth beneath; front tibiæ with their upper portion compressed and dilated beneath into a large obtuse tooth, the lower portion slender; anterior tarsi not dilated; posterior rather short, the basal two joints equal or nearly so, the third a little shorter, the fifth shorter than the preceding four together.

The shape of the front tibiæ is very peculiar, and I should hesitate much (on account of this character not being mentioned in M. Fauvel's tabulation) to refer the specimen before me to *Domene* were it not for a note in Dr. Sharp's memoirs on New Zealand

* The measurement of this species, as of others described in the same memoir (Trans. Roy. Soc., S.A., 1887) was unfortunately taken with a millimetre measure which I afterwards discovered to be slightly inaccurate, or rather not in accordance with the theory of a millimetre equalling half a line. The length of *S. latebricola* is 1½ l.

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Coleoptera, in which he distinguishes a genus of *Pæderidæ* from *Domene inter aliia* by its front tibiæ being "almost simple."

The genus *Domene* is characterised in M. Fauvel's Fn. Gall.-Rhén., vol. iii., p. 305,—a work to which I do not know how to procure access.

D. (?) Torrensensis, sp. nov. Tota pallide ferruginea; pedibus paullo dilutioribus; capite prothoraceque confertim subtilissime (illo subaspere), elytris vix minus confertim minus subtiliter, abdomine fere ut caput, punctulatis; prothorace linea mediana longitudinali tenui notato, hac postice sat manifeste elevata antice subobsoleta; elytris prothorace paullo longioribus. Long., $2\frac{2}{5}$ l.; lat., $\frac{2}{5}$ l. (vix).

The head and prothorax bear a system of very faintly impressed and very inconspicuous punctures larger than and additional to the system of very fine close puncturation mentioned above. The antennæ (set back) would reach quite to (but scarcely beyond) the base of the prothorax. The head and elytra are of about equal width, the prothorax being narrower.

This species seems to differ from *D. Australiæ*, Fvl., *inter alia* in being smaller with the elytra longer (in *D. Australiæ* these are said to be scarcely so long as the prothorax,—in the present insect they are distinctly longer). M. Fauvel's description of his species unfortunately consists largely of comparison with a European *Domene* to which I cannot refer, but should judge that its head is less closely punctulate than that of *D. Torrensensis*, as he says that it is "much more sparsely punctured" than that of *D. stilicina*, whereas the head in the present species is punctured about as closely as it well could be.

South Australia; in debris of the Torrens River.

PALAMINUS.

I met with a single example last November (in the Victorian Alpine district) of this genus represented in the Australian described fauna by a single species (*P. Australiæ*, Fvl.) described on a unique specimen from Queensland. As M. Fauvel's description (so-called) is merely a brief comparison with a species from New Guinea which probably is not in any Australian Museum, it is impossible to say whether or not the insect before me is identical; I should judge, however, that it is very similar, but it appears to be a little smaller, and is probably distinct. One feels strongly tempted to treat such worthless descriptions as non-existent.

BLEDIUS.

B. insignicornis, sp. nov. Minus nitidus; antice pube fulva minus crebre vestitus, abdomine setis erectis instructo; niger; mandibulis (his elongatis) antennarum que basi plus

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minus rufescentibus, pedibus (tibiis nonnullis exemplis apicem versus infuscatis) et elytrorum macula magna laterali, testaceis; capite prothoraceque (hoc sat transverso, medio canaliculato, leviter minus crebre punctulato) alutaceis; elytris prothorace sat longioribus, sat fortiter sat crebre punctulatis; abdomine subnitido subalutaceo, segmentis singulis apicem versus punctulatis.

Maris mandibulis supra in medio dente suberecto armatis; tuberculis antennariis valde productis; antennis corporis dimidio longioribus.

Feminæ mandibulis inermibus; tuberculis antennariis parvis; antennis brevioribus. Long., $1\frac{4}{5}$ l.; lat., $\frac{2}{5}$ l.

The antennal tubercles of the male are produced into elongate subcylindric processes, while in the same sex the basal joint of the antennæ is extraordinarily developed (being as long as the prothorax), and the antennæ set back would reach almost to the apex of the elytra. The general facies is entirely that of a typical *Bledius*. The large conspicuous testaceous spot on the elytra near the lateral margin is a very distinctive character.

Victoria; on the banks of the Ovens R.

B. Ovensensis, sp. nov. Sat nitidus (capite prothoraceque subopacis); pube argentea vestitus, abdomine setis erectis instructo; niger, mandibulis tibiis tarsisque rufescentibus; capite prothoraceque (hoc minus transverso, lateribus pone medium sinuatim convergentibus) creberrime subtilissime punctulatis; elytris prothorace multo longioribus, crebre sat fortiter punctulatis; abdomine supra vix perspicue (subtus sparsius sat fortiter) punctulato; antennis brevibus.

Maris (?) prothorace haud canaliculato.

Feminæ (?) prothorace longitudinaliter subtiliter canaliculato. Long., $1\frac{1}{2}$ l.; lat., $\frac{3}{10}$ l.

This species must be near *B. aterrimus*, Fvl., but seems to differ by its differently coloured legs and much longer elytra; these latter are described as scarcely longer than the prothorax in *B. aterrimus*, whereas in the present species they are not much shorter than the head and prothorax together.

Victoria; on the banks of the Ovens R.

B. infans, sp. nov. Totus nitidus; pube argentea vestitus, abdomine setis erectis instructo; niger; mandibulis pedibus et nonnullis exemplis antennarum apice rufo-testaceis; capite prothoraceque (hoc minus transverso, lateribus pone medium sinuatim convergentibus, linea dorsali vix impressa) sublævigatis; elytris prothorace multo longioribus, crebre sat fortiter punctulatis; abdomine supra vix perspicue (subtus sparsim sat fortiter) punctulato; antennis brevibus. Long., 1 l. (vix).

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Singularly like the preceding in miniature; differing from it chiefly by its differently coloured legs and nitid sublævigate head and prothorax. It is to be noted, however, that in some examples the femora are more or less infuscate.

Victoria; on the banks of the Ovens R.

PSELAPHIDÆ.

CTENISTES.

C. Andersoni, sp. nov. Rufo-castaneus, elytris postice piceis; antennis minus brevibus; prothorace leviter tranverso lateribus evidenter calloso, impressione basali intermedia antice subfurcata; elytris prothorace dimidio longioribus. Long., 1 l.; lat., $\frac{2}{5}$ l.

The antennæ are elongate, reaching back beyond the middle of the elytra; joints 1 and 2 short, slightly thicker than the following ones; 3-10 very slightly increasing in thickness. Of these, 3 and 7 are longer than the others and equal to each other, 8 is the shortest and is wider than long, 9 is scarcely longer than 8, 4 is scarcely longer than 9, 5 about equal to 4, 6 a little shorter than 7, 10 scarcely shorter than 7 [7 is quite twice as long as 8]; the eleventh joint is as long as the preceding three together, and is moderately dilated on one side from the base to beyond the middle, and then narrows again to the apex.

This species is evidently near *C. impressus*, Shp. (the largest Australian *ctenistes* previously described),* but is considerably larger. The antennal joints are very differently proportioned, but not in such fashion as to suggest difference of sex; and the antennæ are considerably longer I should judge (they certainly could not well be called "rather short," as those of *impressus* are). The expression, "elytra distinctly longer than the thorax," applied to *C. impressus*, moreover, suggests shorter elytra than those of *C. Andersoni*, especially in view of *C. simplex*, Shp., being said to have elytra half again as long as its prothorax, and to be distinguished from *C. impressus* by its proportionally shorter prothorax.

S. Australia; taken by my friend, Mr. J. Anderson.

BRYAXIS.

B. Lindensis, sp. nov. Nitida; setis erectis sat crebre vestita; vix perspicue punctulata; piceo-nigra; pedibus piceis (tibiis antice et tarsis omnibus pallidioribus), antennarum articulis

* *C. impressus* is stated by its author to be smaller than *C. vernalis*, King, but this seems to be a mistake, as the size given is $1\frac{1}{2}$ mm. = $\frac{1}{18}$ inch, whereas *C. vernalis*, King, is given as $\frac{3}{20}$ inch. The mistake no doubt arises from Archdeacon King having in his original description of *C. vernalis* set down the size as $\frac{3}{25}$ inch, and afterwards (Tr. Ent. Soc., N.S.W., I., p. 102) stated that this was a mistake.

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1-4 11que rufo-testaceis; capite elongato, inter antennas impresso, postice utrinque fovea magna instructo; prothorace brevi vix subcordato, basi utrinque foveolato, foveis linea transversa conjunctis; elytris prothorace dimidio longioribus, stria suturali profunda altera discoidali (hac apicem versus abbreviata) instructis. Long., $1\frac{1}{5}$ l. (vix); lat., $\frac{3}{5}$ l.

The antennæ are stout and rather short (scarcely longer than the head and prothorax together); joint 1 is scarcely so long as 2 and 3 together, 3 is much more slender than the rest, 5 and 6 are stouter (5 scarcely larger than 6), 5-10 all transverse and not much different *inter se*, but all a little triangularly dilated on the inner side (so that the antennæ seem subserrate), 11 subconic and nearly as long as the preceding two together, but not stouter.

I am doubtful of the sex of the example before me, as I find no noticeable character in the ventral segments, while the antennal structure seems rather of the male type.

I do not think any previously described Australian *Bryaxis* of large size is of a nearly uniform black colour.

S. Australia; in seaweed near Port Lincoln.

B. Harti, sp. nov. Nitida; minus angusta; breviter pubescens; subtiliter minus crebre punctulata; ferruginea; antennis apicem versus infuscatis; his minus elongatis, apice gradatim sat fortiter dilatatis; capite inter antennas impresso, inter oculos foveis 2 magnis profundis instructo; prothorace sat transverso, sat crebre punctulato, trans basin 3-foveolato (fovea media vix perspicua), foveis linea sulciformi conjunctis; elytris prothorace plus dimidio longioribus, antice minus angustato, striis suturali et discoidali fortiter impressis; abdominis segmento 1° 2° paullo longiori, simplici. Long., 1 l. (vix); lat., $\frac{2}{5}$ l.

Maris segmentis ventralibus in medio impressis, ultimo foveam subrotundatam (penultimo processum tuberculiformem) ferenti; tibiis intermediis intus fortiter emarginatis, super et infra partem emarginatam dentes acutos singulos ferentibus; tibiis anticis intus spina minuta sat longe ante apicem armatis; antennarum articulo 9° 10° vix minore.

Feminæ segmentis ventralibus tibiisque simplicibus; antennarum articulo 9° 10° multo minore.

The central basal fovea of the prothorax (as in *B. Ovensensis*) is scarcely more than a slight dilatation of the transverse furrow. The antennæ are as long as the head and prothorax together; joints 1 and 2 are stouter than the following joints; 1 a good deal longer than 2, 3 a little longer than 2; 4-7 scarcely so long as 3, and differing little *inter se* except in 5 being a little the

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stoutest; 8 shorter but not less stout (it is distinctly transverse); 9 and 10 about equally wide, but 10 a little longer (9 transverse, 10 scarcely so) in the male [in the female 9 is about intermediate in size between 8 and 10, and 5 is not at all dilated]; 11 somewhat oval, as long as 9 and 10 together, and in the middle wider than either.

This species does not seem very near to any other previously described. The discoidal stria of the elytra seems a little less strongly impressed in some specimens than others, but I think this is an accidental variation.

South Australia; I have taken it near Adelaide, and also find it among some Adelaide specimens taken by the late Mr. Hart. It occurs among vegetable debris on the banks of streams.

B. hyalina, Schaufuss. Last November I found a *Bryaxis* in the Alpine district of Victoria which agrees fairly well with the description of this species so far as it goes, but it is impossible to be sure, as the description is very defective—not mentioning the puncturation of any part, and only casually alluding to the existence of any sculpture on the basal dorsal segment of the hind body. If the insect in question be distinct from *B. hyalina*, I should judge that it is likely to be distinguished by the two oblique striæ which run hindward from the front of the basal dorsal segment of the hind body being more strongly divergent, and by the puncturation being different; this on the head, prothorax, and hind body is fine, somewhat sparse, and inconspicuous; while on the elytra it is much coarser and closer, more so than is usual in (at least the Australian species of) the genus. From *B. flavipes*, Schauf. (another allied species), the long basal segment of its hind body will distinguish the present insect, which seems to agree with *B. flavipes* in having the striæ of the basal dorsal segment strongly divergent hindward.

B. inusitata, sp. nov. Nitida; sat brevis; sparsim ochraceo-hirsuta; ferruginea; antennis minus robustis; capite sat brevi, antice transversim 3-foveolato, postice utrinque fovea majori instructo; prothorace transverso lævi, postice foveis 3 (transversim positis nec linea conjunctis) instructis; elytris prothorace vix longioribus, transversis, perspicue punctulatis, humeris subtuberculiformibus, stria suturali profunde impressa discoidali subtilissima; abdominis segmento 1° quam 2us 3us que conjuncti sublongiori, basi fortiter transversim sulcato, utrinque juxta sulcum stria longitudinali instructo. Long., $\frac{3}{5}$ l.; lat., $\frac{3}{10}$ l. (vix).

The antennæ are about equal in length to the head and prothorax together. The basal two joints are very similar *inter se*,

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each being much stouter, but not much longer than joint 3; joints 3-8 scarcely differ in thickness, except that 5 is very slightly stouter than 4 and 6; 4, 6, 7, and 8 are about equal in length *inter se*, and are slightly shorter than 3 and 5, which also are about equal *inter se;* 9 is scarcely longer than 8, but is stouter; 10 is very little longer, but a good deal wider, being transverse; 11 is about the same length as the preceding two together, and is still stouter than 10.

This species appears to me to stand near *B. brevis*, Schauf., which M. Raffray has formed iuto a new genus or subgenus, under the name *Schaufussia*. Although it comes very near Herr Schaufuss' description of the species, it does not present the character in the palpi on which *Schaufussia* is founded, and it differs from Herr Schaufuss' description in having the prothorax lævigate. I think its small size, short elytra, prothorax with three unconnected basal foveæ and curiously sculptured basal segment of the hind body are characters that in combination will suffice for identification. I do not find any characters decidedly determining the sex of the two examples before me.

S. Australia; in moss near Port Lincoln.

B. Ovensensis, sp. nov. Nitida; angusta; sparsim hirsuta; ferruginea; capite abdomineque vix infuscatis; antennis elongatis sat gracilibus; capite elongato lævi, inter antennas inæquali inter oculos 3-foveolato, foveola intermedia parva; prothorace vix transverso vix cordato, trans basin 3-foveolato (fovea media minus perspicua), foveis linea forti sulciformi conjunctis; elytris prothorace dimidio longioribus sparsim obscure punctulatis, antice fortiter angustatis, striis suturali et discoidali profunde impressis, abdomine ut elytra obscure punctulato.

Maris abdominis segmentis ventralibus in medio planatis; tibiis posticis apice valde introrsum curvatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{2}{5}$ l.

The antennæ are distinctly longer than the head and prothorax together, and none of the joints are transverse; joints 1 and 2 are a little stouter than the following ones (1 a little stouter than and nearly twice as long as 2), 3-7 a little longer than 2 and subequal *inter se*, 9 very like 2 and slightly larger than 8, 10 about as long as 3, but much wider (almost transverse), 11 fully as long as 9 and 10 together, and evidently wider than 10; joints 1-7 (except, perhaps, 2) are all much longer than wide.

This species is very near *B. strigicollis*, Westw., structurally, but its facies is very different (form narrower and more elongate, antennæ longer and more slender, &c.). It seems to be also near *B. hortensis*, King, *lunatica*, King, and *electrica*,

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King. From the first and last of them its antennal structure furnishes a ready distinction. I should hesitate to separate it from *lunatica* were it not for the phrase, "thorace breviter obcordato," in the description of that insect, a phrase which could not be rightly applied to the present insect, the prothorax of which is scarcely, if at all, wider than long. In the figure of the magnified antenna of *B. lunatica*, moreover, the second joint is represented as longer than the third, which is not the case in *B. Ovensensis*.

Victoria; in a marsh near the banks of the Ovens River, among dead leaves.

B. paludis, sp. nov. Nitida; sat angusta; vix pubescens; vix perspicue punctulata; ferruginea, antennarum clava vix pallidiori; antennis minus elongatis, clava 2-articulata, hac valde dilatata et elongata; capite inter oculos minute bifoveolato; prothorace æquali minus transverso, quam caput paullo longiori; elytris quam prothorax fere duplo longioribus, striis suturali sat distincta discoidali nulla.

Maris segmento basali ventrali antice creberrime aspere punctulato, postice obscure tuberculato, segmento apicali fovea rotunda impresso; tibiis intermediis intus in medio obtuse dentatis, posticis apicem versus dilatatis arcuatis.

Femina latet. Long., $\frac{1}{2}$ l.

The antennæ are scarcely so long as the head and prothorax together; the club consists of two joints, and is not much shorter than all the preceding joints together, and is very strongly dilated. Joints 1 and 2 are very stout and cylindric, 1 a little longer and stouter than 2; joints 3-9 stout and scarcely increasing in thickness, 3 scarcely transverse, the following joints becoming more so; 10 is about three times as wide as 9, and is as long as the preceding 3 joints together; 11 is of about the same width, and nearly twice as long as 10.

S. Australia; in debris on some marshy ground near Adelaide.

EUPINES.

This name was proposed by Archdeacon King for what he considered a subgenus of *Bryaxis*. I am inclined to think it may be treated as a good genus. I have seen numerous species referable to it, and find that (besides the characters mentioned by its author) they agree in exhibiting a uniform type of sexual peculiarity in the sculpture of the meta-sternum and second (the first that is readily apparent) of the ventral segments of the hind-body. The following Australian species apparently attributable to *Eupines*, have already been described (most of them as *Bryaxis*), viz:—

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æquata, King	exigua, King	pumilio, Schauf.
affinis, Schauf.	diversicolor, Schauf.	spreta, Shp.
ampliventris, Schauf.	geminata, King	sobrina, Schauf.
aurora, Schauf.	globulifer, Schauf.	sulcata, Shp.
capitata, King	melanocephala, Schauf.	transversa, King
clavatula, King	picta, Schauf.	Victoriæ, King
concolor, Shp.	polita, King	vitrea, Schauf.

The following are distinguished from the above species of *Eupines* (though Archdeacon King did not consider the distinction more than sectional) by having antennæ of only 10 joints :—

Elizabethæ, King
laticlava, Schauf.

I am doubtful whether the following are *Eupines* :—

atra, King
læviceps, Schauf.
talpa, Schauf.
plecta, Shp.

The species of *Eupines* have much resemblance *inter se* as regards their superficial characters, but, so far as I can judge, are very well characterised by the sexual peculiarities of the metasternum and ventral segments. Unfortunately these are recorded in the description of the following only :—

concolor, Shp.
sulcata, Shp.
spreta, Shp.

There are sexual characters also in the antennæ and tibiæ of at least some species, which are more or less exactly recorded in the descriptions of many of the above-named.

The following species in my collection seem to be clearly distinct from any previously described, although it is possible (as noted below) that the first may be an Alpine form of one of Herr Schaufuss' species.

E. sororcula, sp. nov. Mas. Fere lævis ; picea, prothorace vix rufescenti, elytris sanguineis apice infuscatis, antennis palpis pedibus segmentisque ventralibus apicalibus testaceis ; setis erectis parce vestita ; capite inter oculos bifoveolato, inter antennas vix biimpresso et transversim leviter elevato, antice declivi ; prothorace æquali, leviter transverso, vix subcordato ; elytris prothorace fere duplo longioribus, humeris callosis, striis suturalibus distinctis ; antennis capiti prothoracique conjunctis subæqualibus, tibiis posticis apicem versus leviter dilatatis et sinuatis ; abdominis segmento dorsali 1° oblique bistriato, segmento ventrali 2° a basi ad apicem subtiliter in medio carinato ; meta sterno postice fovea profunda minori instructo (hac in fundo longitudinaliter sulcata). Long., ½ l.

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Of the antennæ, joints 1 and 2 are stouter than any of the following 6, and are together scarcely so long as joints 3-5 together; 3 and 4 are equal *inter se*, each much shorter than 2; 5 is very evidently but not very much longer and stouter than 4; 5-8 are equal *inter se*, and each a little smaller than 4; 9 is short and transverse, about as wide as 1; 10 not much longer than, but nearly twice as wide as, 9; 11 a little wider than, and about twice as long as, 10; none of the joints 1-8 are transverse.

Femina. A mare differt antennis (præsertim articulis intermediis) obscurioribus, longioribus, articulis aliter proportionatis; metasterno postice minus fortiter impresso, abdomine simplici.

Of the antennæ of the female, joints 3 and 4 and 6-8 are a little more elongate; 5 is not much longer or stouter than 3; 9 and 10 are together about as long as 6-8, neither of them transverse, 10 longer and wider than 9; 11 is a little longer but scarcely wider than 10.

The superficial characters of this species seem to be near those of *Bryaxis vitrea*, Schauf., of which no sexual distinctions are recorded by its author; the difference in colour is considerable, so that this form is at least deserving of a varietal name, even if it should eventually turn out to be a form of *vitrea*.

Victorian Alps.

E. nauta, sp. nov. Mas. Fere lævis; picea, prothorace vix rufescenti, elytris lateritiis, pedibus et antennis (articulis penultimis exceptis) rufis vel rufo-testaceis; glabra; capite prothoraceque æqualibus; hoc sat transverso vix subcordato; elytris prothorace plus dimidio longioribus, humeris vix callosis, striis suturalibus distinctis; antennis quam caput prothoraxque conjuncti vix longioribus; femoribus anticis subtus obtuse dentatis, tibiis anticis intus dente lato sat acuto armatis, femoribus ceteris dilatatis (posticis subtus fere subdentatis); metasterno late profunde excavato, parte excavata in medio obsolete longitudinaliter carinata; abdominis segmento ventrali 2° opaco creberrime aspere punctulato, fossa lata (hac apice carina elevata transversa terminata) per totam longitudinem impresso. Long., $\frac{3}{5}$ l.

Of the antennæ, joints 1-3 decrease successively in thickness, 2 and 3 being almost equal to each other in length, 1 a little longer; joints 3-8 scarcely differ in thickness, except 5, which is scarcely thicker than the rest; 4, 6, and 7 are equal *inter se*, each a little shorter than 3 and 5, which are of equal length; 8 is a little shorter than 7; 9 is almost globular, a little longer and stouter than 8; 10 is a little longer than 9, and nearly twice as wide, being pretty strongly transverse; 11 is very little wider

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than 10, but is about twice as long; 10 is the only really transverse joint.

Femina. A mare differt antennarum articulo penultimo minus transverso; metasterno multo minus fortiter impresso; femoribus, tibiis, abdomineque simplicibus.

A marked character in this species is the strong contrast in respect of colour between the last two antennal joints; the almost complete absence of setæ, and also of foveæ on the head (two foveæ seem barely indicated in one or two examples), is also distinctive. The exposed portion of the hind body is strongly declivous.

The sexual characters in the antennæ are exceptionally slight, those in the legs, metasternum, and second (the first being scarcely visible) ventral segment are far stronger than in any other *Eupines* known to me.

S. Australia; near Port Lincoln, under the bark of a tree surrounded by flood waters.

E. nautoides, sp. nov. Mas. Ab *E. nauta* vix differt nisi tibiis anticis intus haud dentatis, metasterno postice minus excavato, abdominis segmento 2° simplici, elytrorum sutura postice carinata, retrorsum spiniformi producta. Long., $\frac{3}{5}$ l.

This insect, of which I possess two examples, is a very puzzling one, and I know not whether to regard it as an abnormal form of *E. nauta*, or as a distinct species; but its differences (such as they are) are so strongly marked that there seems to be certainly good reason for its having a distinctive name. I cannot even feel sure whether it is a male or a female, its ventral character being suggestive of the latter sex, while its dentate femora point very strongly to the former. On the whole I incline to think it the male of a good species of which I have not seen the female; the strong spine into which its elytra are produced at the sutural apex will at once distinguish it from all its described congeners. In the examples before me the legs are of much darker colour than in any *E. nauta* that I have seen, but this is quite likely to be accidental.

S. Australia; near Port Lincoln.

E. spiniventris, sp. nov. Mas. Ab *E. nauta* differt antennis sublongioribus; femoribus simplicibus; tibiis anticis posticisque (haud dentatis) paullo ante apicem intus emarginatis; metasterno multo magis late magis profunde excavato; abdominis segmento ventrali 2° sat nitido haud longitudinaliter impresso, postice tuberculum subconicum antrorsum directum, apice acutum formanti.

Femina latet.

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My example of this insect is certainly a male, and though very close to *E. nauta* its sexual characters are quite inconsistent with the idea of specific identity. The emargination on the inner side of the front tibiæ is quite noticeable, but occupies only a small part of the tibia; that of the hind tibia is much larger, nearly the apical third part of the inner margin being very slightly concave. The hind tibia is at its widest just above the emargination, so that the dilatation at that point is capable of being regarded as a feeble tooth. The metasternum is largely, deeply, and almost circularly excavated; the corresponding excavation in *E. nauta* appearing as a wide longitudinal impression. The tubercle on the second ventral segment is of peculiar shape, and difficult to characterise intelligibly; the hind margin of the segment seems to be gradually elevated from either side towards the middle (where it is quite spiniform), and also bent forward; so that if the insect be viewed from the side, an inclined plane ending in a sharp point seems to run upward and forward from the apex of the second segment towards the metasternum.

South Australia; near Port Lincoln.

E. militaris, sp. nov. Mas. Fere lævis, sparsim obscure punctulata; glabra; picea elytris pedibusque manifeste, antennis vix manifeste, rufescentibus; capite haud (vel vix manifeste) bifoveolato; prothorace æquali sat transverso leviter cordato; elytris prothorace dimidio longioribus, humeris callosis, striis suturalibus sat fortiter impressis; antennis capiti prothoracique conjunctis longitudine æqualibus, fortiter clavatis; femoribus basin versus pedunculatis, intermediis subtus dente parvo armatis; tibiis intermediis ante apicem extus leviter emarginatis; metasterno late profunde excavato; abdominis segmento ventrali 2° in medio impresso et utrinque obscure tuberculato. Long., $\frac{9}{20}$ l.

Of the antennæ, joints 1 and 2 are much stouter than any of the following six joints (which are of uniform thickness), 1 being much longer than 2; 4, 6, and 8 are equal *inter se*, and are the shortest joints; 3 is equal to 2 in length, 5 a little shorter, 7 nearly as short as 4, 6, and 8; 9 is strongly transverse, being scarcely longer than 8, but much wider; 10 is still more transverse, being a little longer than, and about twice as wide as, 9; 11 is ovate, being twice as long as 10, but scarcely wider; 9 and 10 each have a curved pencil of seta on either side at the apex.

Femina. A mare differt femoribus, metasterno, abdomineque simplicibus.

The antennæ of the female scarcely differ from those of the male except in being a trifle shorter.

South Australia; near Port Lincoln.

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The species of *Eupines* described above may be thus tabulated.

A. Glabrous or nearly so.
  B. Antennæ unicolorous, or nearly so ... militaris.
  BB. Apical joint of antennæ pallid, in strong contrast to joint 10.
    C. Sutural apex of elytra simple.
      D. Front femora and tibiæ toothed in male ... ... nauta.
      DD. Front femora and tibiæ simple in male ... ... spiniventris.
    CC. Suture of elytra spiniform at apex ... ... nautoides.
AA. Body clothed with long erect setæ ... ... sororcula.

SILPHIDÆ.

CHOLEVA.

This genus seems to be fairly well represented in Australia; although only two species have been described. Of these *C. australis*, Er., may be distinguished from all other species known to me by the following characters in combination:—Colour and pubescence black; mesosternum finely carinate; prothorax and elytra transversely strigose. *C. obscurus*, Macl., has not been formally described—the only indication of its characters being a statement (Tr. Ent. Soc. N.S.W., II., p. 155) that it differs from *C. australis* in its pubescence being light coloured, and its prothorax and elytra longitudinally, instead of transversely, scratched or striolated. If it is to be inferred that the prothorax is *distinctly* striolate longitudinally (in the same manner that it is transversely in *C. australis*) I am confident that I have not seen the insect; if the reference be merely to the slight longitudinally striolate appearance resulting (in many species of the genus) from the direction of the adpressed hairs which clothe the surface, there is nothing in the description which would distinguish *C. obscurus* from any species (with one or two exceptions) of *Choleva* known to me. In this latter case it is impossible to describe any new species without running some risk of re-naming Sir W. Macleay's insect; subject to that remark, the following appear to be new. It may be noted that in the Australian species of *Choleva* having the mesosternum carinate (so far as my own observation goes) the carina is not a strongly elevated one like that of the European *C. sericeus*, Fab., but a very fine line running down the centre of the segment, and usually becoming obsolete in the front part; the front part, however, consisting of a sort of thickened transverse fold, which is more *elevated* than the carina, although not truly carinate (as in

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many European *Cholevæ*, in which the mesosternum is non-carinate).

C. australis, Er. The specimens which I attribute to this species were taken in the neighbourhood of Adelaide. The only doubt I feel as to their identity is caused by the antennæ being a little stouter than seems quite consistent with the description, which, however, is very brief and general in respect of the antennæ. They are very much like those of the European *C. sericeus*, Fab., to which, indeed, the insect before me bears a very close general resemblance, differing chiefly in its more uniformly black colour (the base of the antennæ even being only a little pitchy), in its very much more finely carinate mesosternum, and in the more rounded sides of its elytra, which are decidedly dilated behind the base; the sculpture of the upper surface scarcely differs in the two species. I am doubtful of having seen the male of *C. australis*, as I do not find any decidedly sexual differences among the few examples I have examined, the tarsi of none of them being distinctly dilated

C. antipodum, sp. nov. Sat elongata; minus parallela; piceo-ferruginea (antennarum articulis basalibus 2 apicalique, capite antice, prothoracis lateribus, pedibus, et corpore subtus, dilutioribus); obscure piceo-pubescens; creberrime subtilissime punctulata; antennis gracilibus, articulo 8° quam 7us tenuiori nec breviori; mesosterno antice simplici, inter coxas intermedias spiniformi. Long., $1\frac{3}{5}$ l.; lat., $\frac{7}{10}$ l.

The antennæ are considerably more slender than in any European species known to me of *Choleva* (*e.g.*, *C. agilis*, Illig.). They are conspicuously longer than the head and prothorax together. Joint 1 is much stouter and slightly shorter than 2; joints 3-6 are of equal thickness *inter se*, more slender than 2; 3 slightly longer than (4-6 each about equal to) 2; 7 slightly shorter and a little wider than 6; 8 as long as, but evidently narrower than, 7; 9 and 10 wider, and slightly shorter, than 8; 11 scarcely wider, but evidently longer, than 10, and acuminate at apex. I do not find any well-marked sexual characters. The mesosternal carina scarcely emerges forward from between the coxæ; the puncturation is finer and slightly closer than in (say) the European *C. tristis*, Panz.

Victoria; in the Alpine district, under fallen leaves.

C. Adelaidæ, sp. nov. Minus elongata; ovalis; ferruginea, capite prothoracisque disco obscurioribus; fulvo-pubescens; supra subtiliter (in prothorace subtilissime) transversim punctulato-strigosa; antennis sat brevibus robustis, articulo 8° quam 7us et 8us paullo angustiori multo breviori; mesosterno subtiliter carinato. Long., 1 l.; lat., $\frac{1}{2}$ l. (vix).

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The antennæ are scarcely longer than the head and prothorax together, and seem in respect of robustness and build not very different from those of common European species (*e.g.*, *C. sericea*, Fab.). Joints 1 and 2 are stouter than those immediately following—1 evidently longer than 2; 3-6 moderately increasing in width (3 scarcely shorter than 2, 4 and 5 shorter subequal *inter se*, 6 considerably shorter; 7-11 forming a subparallel club which is nearly as long as joints 1-6 together; 7, 9, and 10 subequal *inter se* (each evidently wider than, and about twice as long as, 6); 8 same width as 6, but still shorter; 11 subconical, a little longer and narrower than 10; joint 6 is strongly, and 8 very strongly, transverse. The sculpture of the upper surface is nearly as in *C. australis*, Er. In the male the front tarsi are pretty strongly (the basal joint of the intermediate tarsi scarcely, if at all) dilated. An example from Port Lincoln has the antennæ with the longer joints testaceous, the shorter one, piceous, but does not seem to differ otherwise.

South Australia; in flood refuse near Adelaide, also near Port Lincoln.

C. Victoriensis, spec. nov. Sat elongata; sat parallela; piceo-ferruginea, antennarum basi prothoracis lateribus, pedibusque rufescentibus; obscure pubescens; capite prothoraceque subtiliter crebre, elytris minus subtiliter minus crebre, punctulatis; antennis minus elongatis, sat robustis, articulo 8° quam 7us et 8us multo angustiori multo breviori; mesosterno subtiliter carinato. Long., 1 l.; lat., $\frac{2}{5}$ l.

The antennæ are perhaps a trifle longer than the head and prothorax together; they are evidently more slender than those of *C. Adelaidæ*, but much stouter than those of *C. antipodum*. The basal six joints are proportioned *inter se* almost as in *C. Adelaidæ*, but are more slender; 3-6 of equal width (not as in *Adelaidæ*, 4-5 each a little wider than its predecessor); joints 7-11 form a parallel club less noticeably wider than the basal part of the antennæ than in *Adelaidæ*, but with joints similarly proportioned *inter se*; owing to the much greater slenderness of the antennæ, however, joint 6 is not, and 8 is only moderately, transverse. The sculpture of the upper surface resembles that of *C. antipodum*, but is decidedly less fine on the elytra. In the male the front tarsi are strongly, and the basal joint of the intermediate tarsi is distinctly, dilated.

Victoria; Alpine district, among fallen leaves.

C. minuscula, sp. nov. Vix elongata; subovalis; fusco-rufa, antennarum articulis intermediis, elytris abdomineque obscurioribus; pubescens; subfortiter minus confertim punctulata; antennis fere ut *C. Victoriensis* sed fere gracilioribus; mesosterno simplici. Long., $\frac{1}{5}$ l.; lat., $\frac{1}{5}$ l. (vix).

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The antennal joints are proportioned *inter se* almost exactly as in the preceding two species, the antennæ as a whole being, however, a trifle more slender than, but of about the same length as, those of *C. Victoriensis;* they are clearly less slender than those of *C. antipodum.* The puncturation of the upper surface is conspicuously less fine than in *C. Victoriensis.* In the male the front tarsi are only gently and the intermediate scarcely if at all dilated. The general appearance is very suggestive of the European *C. Wilkini*, Spence; but the puncturation is distinctly coarser, and the antennæ are more slender than in that species.

South Australia; widely distributed; in vegetable débris.

N.B.—The following is a tabulation of the described Australian species of *Choleva*, the only one omitted, so far as as I know, being *C. obscura*, Macl.

A. Mesosternum carinate.
  B. Antennæ of ordinary character.
    C. Prothorax transversely strigose.
      D. Size very small; colour not black... ... Adelaidæ, Blackb.
      DD. Size moderate; colour black ... ... australis, Er.
    CC. Prothorax not transversely strigose ... ... Victoriensis, Blackb.
  BB. Antennæ very long and slender antipodum, Blackb.
AA. Mesosternum simple ... ... minuscula, Blackb.

CHOLEVOMORPHA, gen. nov.

Gen. *Cholevam* simulat; differt trochanteribus posticis fere ut *Anisotomæ* formatis; tibiis omnibus spinosis; antennis gracillimis; maris tarsis anticis 3-unguiculatis.

This singular insect would have to be referred to the *Anisotomides*, on M. Lacordaire's arrangement, although its facies is much more that of the *Silphides.* The species before me has the appearance of a very wide robust *Choleva*, with extremely fine slender antennæ and variegated elytra. The antennæ are evidently longer than the head and prothorax together; all the joints are much longer than wide, and are thinly beset with longish fine setæ; of the basal six joints, joint 2 is the stoutest (1 being much longer, but scarcely so stout), 3-6 very slender (4-6 scarcely, 3 considerably, shorter than 1), 7-11 form a feeble club (being together very little shorter, but evidently stouter, than 3-6 together), and are somewhat equal *inter se*, except joint 8, which is much shorter and evidently more slender than the rest (nevertheless, joints 7 and 9 are evidently longer than 10 and 11). The mesosternum is not carinated, although it is very convex, and presents somewhat the appearance of coming to a ridge down the

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middle line. In the male, the front tarsi have their basal joint triangular and strongly dilated, joints 2 and 3 dilated, but successively less so; joint 4 is very small, 5 oval and dilated as long as the preceding three together; joint 5 bears at its apex three unequal claws, of which one (the longest) is inserted immediately before the apex, and is strongly curved and scarcely shorter than the apical joint of the tarsus, while the other two are *at* the apex and are much shorter—one shorter than the other. The intermediate tarsi of the male are considerably longer than the front, and scarcely shorter than the hind, ones; these four posterior tarsi scarcely differ *inter se*, except that the basal joint of the intermediate is evidently dilated. In both pairs, joints 1 and 5 are of equal length, and each as long as joints 2-4 (which are subequal *inter se*) together. The claws are obtusely subdentate at the base. The spines on the front tibiæ are fine and inconspicuous; those on the four posterior strong and well defined. All the tibiæ are bispinose at the apex. The female scarcely differs from the male, except in having the anterior four tarsi and the front claws simple.

The superficial sculpture of the insect on which I am founding this genus is very unusual, and extremely like that of *Catops australis*, Er. I have examples of the latter species (or a very close ally of it) in my collection and, notwithstanding this curious resemblance, find that it cannot be associated generically with this new form; it appears to me to be a true *Choleva*.

C. picta, sp. nov. Sat late ovalis; parce pubescens; nigra, antennarum basi, prothorace antice et latera versus, elytrorum maculis nonnullis, pedisbusque, plus minus testaceis vel rufis; prothorace minus crebre granulato, fortiter transverso antice fortiter angustato, angulis posticis retrorsum vix productis; elytris crebre transversim punctulato-striatis, stria suturali sat fortiter impressa. Long., $1\frac{2}{5}$ l.; lat., $\frac{4}{5}$ l.

The pale markings on the elytra are not at all strongly defined in themselves, but are rendered conspicuous by their being clothed with golden pubescence; they consist of a large humeral blotch, a smaller common spot on the suture some distance behind the scutellum, two smaller spots on the front part of the disc, and an irregular narrow fascia of zigzag form about the middle. In some examples some of the markings are wanting.

Victoria; among fallen leaves on the higher mountains (Feathertop, &c.).

SCAPHIDIIDÆ.

SCAPHIDIUM.

S. alpicola, sp. nov. Nitidum; nigrum; prothorace (margine basali et maculis 2 discoidalibus ante medium positis nigris

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exceptis), elytrorum fasciis binis suturam versus abbreviatis, pygidio (macula nigra excepta) et corpore subtus (prosterno medio, mesosterno, metasterni lateribus margineque postico, et abdominis basi nigris exceptis) rufis; oculis minus approximatis; prothorace postice linea transversa arcuata punctulata instructo, lateribus fere rectis; elytrorum sutura et ad basin linea arcuata punctulata impressis, his in medio disci puncturarum seriebus 2 antice et postice abbreviatis instructis.

Maris tibiis anticis elongatis, basi fortiter arcuatis; metasterno punctulato pubescenti, utrinque pilis longissimis penicillam formantibus. Long., $2\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

Colour and markings have been so much relied on in most of the descriptions of Australian *Scaphidia* that it is difficult to specify distinctions other than colour in adding a new species. I have seen several specimens of the insect before me, which I took in decayed wood. Its colouring comes nearest to *S. exornatum*, Oberthür (known to me only by description). In that species the base of the antennæ is said to be red, the femora partly red, the underside (except the apex) black, and the markings of the elytra appear to consist of black spots on a red derm; all these differences point clearly, I think, to specific distinctness—but even if the present insect should be an Alpine form of an already named species, it would be desirable to give it a var. name, as all the examples I have seen are quite identical in colour and markings.

Victoria; in the Alpine district.

SCAPHISOMA.

S. novicum, sp. nov. Obovatum; nitidum, sparsim valde levitei punctulatum; nigrum, palpis antennarum basi pedibus et elytrorum apice testaceis vel rufis; scutello vix manifesto; elytrorum stria suturali prope basin extrorsum arcuata.

Maris metasterno utrinque postice longitudinaliter profunde sulcato, segmento ventrali penultimo minus abbreviato. Long., $\frac{4}{5}$ l.; lat., $\frac{2}{5}$ l.

This species is scarcely distinguishable except by its smaller size, much more feebly impressed (though otherwise very similar) puncturation, and sutural stria bent outward at the base, from the European *S. agaricinum*, Leach. The sexual characters of *S. agaricinum*, however, do not seem to have been recorded, and my type of that insect is a female, so I cannot say whether they are similar to those of *S. novicum*. The male example of the latter, from which I have described what I suppose to be sexual characters is immature (it is almost uniformly testaceous in colour), but I do not think the metasternal characters mentioned

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above can be due to immaturity as they are quite symmetrical on either side. It was taken in company with the other specimens.

Victoria; Alpine district, in fungi.

HISTERIDÆ.

CHLAMYDOPSIS.

I feel some hesitation in referring the following two species to this genus, nor do I feel sure that they ought not to be regarded as members of *two* allied genera, both distinct from *Chlamydopsis*. They certainly, I think, appertain to the *Histeridæ*, and they agree very fairly with Professor Westwood's characters of the said genus (I do not feel quite satisfied whether the antennæ have eight or nine joints) as far as those characters go, but it appears to me that if those characters were drawn up from a species at all closely allied to those before me, they do not sufficiently indicate the extraordinary appearance of the insects, which are among the most wonderful I have ever seen. The two examples before me differ very strongly *inter se* (probably they are male and female of two species), but they agree in the remarkable relation of the head and prothorax to each other—a character so singular that I do not like to separate them generically. The head, including the antennæ, exactly fits into the cavity of the prothorax, without protruding from it in the smallest degree, so that in repose the insect appears to have no head, and when looked at from in front the appearance is of the cavity of the prothorax being stopped by an even vertical plate. If the antennæ be drawn out (no easy task!) the head is visible—the cavity of the prothorax being looked at from in front—occupying the middle portion of the cavity, and having on either side of it a large cavern, which is exactly filled by an antenna when the insect is in a state of repose. The antennæ are on the same plan as those of the *Dynastid*-genus *Cryptodus*, consisting of a large lamelliform basal joint (which is the joint that forms the door of the aperture of the antennal cavity), into the hind surface of which is inserted a very short stem,* at the end of which is a very elongate club, consisting of a single joint. All the tarsi fit completely into cavities in the tibiæ; the front tibiæ fall into grooves of their femora, the front legs fit completely and exactly into cavities at the sides of the prosternum. The whole upper surface is uneven, in a manner defying exact description. The body is furnished with wings. The prosternum is produced anteriorly as in the "Histérides vrais" of Lacordaire. The prosternum and mesosternum present truncate and closely applied faces to each other.

* As already noted, I cannot satisfy myself whether this consists of six or seven joints; but seven is the more probable number.

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In the above characters the two examples before me coincide; they differ very widely in the nature of the inequalities of the surface; in one of them having the hind legs developed to such an extraordinary degree that these are longer than the body, while the hind tibiæ are strongly compressed, and dilated to such an extent that their greatest width is scarcely less than half the width of the prothorax; and in one of them having lateral depressions for the reception of the posterior legs.

It will probably be observed that these characters come very near those of Archdeacon King's genus, *Byzenia*, which that learned author attributes to the *Byrrhidæ* (Tr. Ent. Soc. N.S.W., II., p. 74). I have very little doubt that *Byzenia* is really very near the species I am describing (or that it is a *Histerid*), but the Archdeacon says its "legs are not received into cavities," and this is, perhaps, inconsistent with generic identity. In the description of *Chlamydopsis*, Professor Westwood implies (though he does not state it quite categorically) that there are no cavities for the reception of the legs, and, therefore, I suspect *Byzenia* and *Chlamydopsis* are identical (the memoirs characterising them were read in the same year; I believe Westwood's was published before the other). As regards the insects before me, the existence of cavities to receive some or all of the legs would perhaps justify their having a new generic name (or names), but as they are clearly close allies of *Chlamydopsis* I do not think any confusion will arise if I attribute them to the latter genus in the doubt as to the relation of its legs to the body.

I believe the two species described below to be parasitic on fossorial *Hymenoptera*, as I found them both (in different years and different places) on the top of rotten fence posts in which *Hymenoptera* were making their nests.

C. sternalis, sp. nov, Mas (?). Subopaca; piceo-ferruginea, antennis pedibus elytrisque dilutioribus; subtiliter punctulata et strigosa, puncturis strigisque confuse intermixtis, illis squamas minutas ferentibus; prothoracis lateribus fortiter bisinuatis, disco a basi ad apicem gradatim elevato cristam magnam formanti (cristæ apice subbifido, lateribus declivibus longitudinaliter bisulcatis, facie anteriori verticali subnitida punctata); scutello haud perspicuo; elytrorum humeris valde callosis; pygidio propygidioque verticalibus; pedibus brevibus; prosterno medio longitudinaliter late fortiter carinato, carina media longitudinaliter profunde sulcata. Long., $1\frac{1}{5}$ l.; lat., $\frac{4}{5}$ l. (vix).

The posterior four tibiæ are triangular; the apex of the triangle being regarded as the point of attachment to the femur, its longest side is the inner margin, and its other sides (subequal) are the external margin of the tibia and the obliquely truncate apex of

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the same. The front tibiæ are not very different, but their external margin is distinctly shorter than their obliquely truncate apex, and forms an obtuse tooth at the point of junction with the latter. The legs are about of equal length *inter se*—all evidently shorter than (say) the length of the elytra.

Sonth Australia; near Woodville.

C. inæqualis, sp. nov. Femina (?). Minus opaca; piceo-ferruginea, antennis dilutioribus; crassissime punctulato-strigosa (elytrorum parte basali media, metasterno, abdominisque segmentis basalibus et apicalibus, subtiliter, fere ut *C. sternalis*, sculpturatis exceptis), abdominis parte intermedia fere lævi; prothorace antice valde reflexo elevato-marginato (margine elevato 6-lobato, lobis intermediis 4 quam externi minus elevatis multo minus latis), margine antico quam basis sat latiori, lateribus mox pone marginem anticum retrorsum convergentibus hinc ad basin parallelis; scutello haud perspicuo; elytrorum humeris externe spiniformibus, callis humeralibus maximi gibbosis, parte basali mediana valde depressa (hac subtiliter sculpturata), a parte postica (hac crassissime sculpturata) sulco profundo transverso divisa; pygidio propygidioque rotundatim subverticalibus; pedibus anticis 4 quam elytra (posticis quam corpus totum) longioribus; prosterno æquali. Long., 2 l. (vix); lat., 1 l.

The six lobes into which the strongly upturned front margin of the prothorax is divided are not very apparent unless the outline be looked at obliquely from behind, or from in front. The tibiæ (allowing for the much greater length of the legs) are shaped very much as those of *C. sternalis*, except that the external margin of the intermediate pair meets the truncate hind margin (as in the front pair) in a strong obtuse tooth, and that the external margin of the hind pair is very much longer than the truncate hind margin.

South Australia; near Woodville.

PHALACRIDÆ.

The only Australian species that I can ascertain to have been already described belonging to this family is *Phalacrus brunneus*, Er., from Tasmania, for which, together with *Sphæridium testaceum*, Fab., Dr. Erichson (Ins. Deutsch. III., p. 108) founded a new genus—*Litochrus*. In 1889 a revision of the family, with especial reference to the N. American species was published in the Annals of the New York Academy, in which *Litochrus* seems to have been re-described. I have not been able to consult this memoir, but from the notice of it in the "Zoological Record," I should infer that neither of the species attributed to *Litochrus* by Erichson has been removed from it. I will, however, take the

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precaution of saying that the following species placed in this genus are, no doubt, congeneric with *L. brunneus*, Er. That insect is, unfortunately, not very minutely described by its author; I do not think, however, that any of the species described below can be identical with it. *L. alternans* is the one that comes nearest to it, but it does not seem likely that if Erichson had had that insect before him he could have failed to mention the conspicuous sculpture of its alternate interstices.

LITOCHRUS.

L. leticulus, sp. nov. Breviter ovalis; postice vix angustatus; nitidus; niger; capite antice, elytrorum apice et utrinque macula magna discoidali, antennis, palpis, prothorace lateribus, corpore subtus et pedibus rufo-testaceis; capite prothoraceque vix perspicue punctulatis; elytris vix striatis, striis interstitiisque subtilissime punctulatis. Long., 1 l.; lat., $\frac{3}{5}$ l.

The pale markings on the elytra consist of a wide curved blotch commencing on either shoulder and proceeding towards the suture and almost touching it at the middle of its length; the pale apex of the elytra is produced forward on either side in such fashion that it almost touches the exterior hind corner of the discal blotch. The pale colouring occupies almost as much area as the black; the latter forms a large triangle, the base of which is the base of the elytra, and its apex is produced narrowly down the suture to about the middle where it dilates into a large blotch; there is also a large black space on either side, which is continuous along the base with the black of the suture.

Victoria; Alpine district.

L. Palmerstoni, sp. nov. Breviter ovalis; postice leviter angustatus; nitidus; ferrugineus; antennis, palpis, elytrorum apice, pedibus, et corpore subtus, testaceis; vix perspicue punctulatus; elytris vix striatis. Long, $\frac{4}{5}$ l. (vix); lat., $\frac{1}{2}$ l.

This minute insect appears to be a typical *Litochrus*. Its uniform ferruginous colour, with the apex of the elytra pale testaceous, and almost impunctulate surface, will, I think, distinguish it from all its described congeners.

N. Territory of S. Australia; near Palmerston.

L. alternans, sp. nov. Ovalis, postice attenuatus; nitidus; supra lividus, hic illic infuscatus, cœruleo-iridescens, antennis palpis pedibus et corpore subtus testaceis; capite prothoraceque subtilissime crebre punctulatis, hoc puncturis nonnullis majoribus hic illic impresso; elytris, vix striatis, striis puncturis minutissimis sat crebre impressis, interstitiis alternis sublævibus et puncturis sat magnis seriatim sparsim instructis. Long., $1\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.

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This species seems to be well distinguished by its peculiar puncturation—very fine, close, and evenly distributed—the prothorax bearing also a few scattered punctures evidently much larger; and the elytra having their scarcely marked striæ closely set with excessively fine punctures, while a conspicuous row of considerably larger and widely spaced punctures runs down interstices 1, 3, &c., 2, 4, &c., being almost lævigate; thus the widely spaced punctures of the alternate interstices are much the strongest sculpture of the elytra.

Victoria; Alpine district.

L. maculatus, sp. nov. Breviter ovalis; postice vix angustatus; nitidus; piceus; antennis, palpis, pedibus, capite antice, corpore subtus, et macula magna triangulari communi in elytrorum medio posita, testaceis; capite prothoraceque creberrime subtilissime punctulatis; elytris vix striatis, striis puncturis subtilibus seriatim impressis, interstitiis alternis sublævibus et puncturis sat perspicuis seriatim sparsim instructis. Long., 1 l.; lat., $\frac{3}{5}$ l. (vix).

The colouring of this species (which seems to vary only a little in intensity, and in the elytra of some examples being reddish towards the apex) will, I think, distinguish it from all its congeners. Its sculpture is very like that of *L. alternans* (though the punctures in the alternate interstices are scarcely larger than in the striæ), but its size and shape, as well as its markings, are very different and seem to be constant. A short series taken in the Victorian Alps seems attributable to this species, although the specimens vary greatly in size, some being quite twice as large as the South Australian examples; the red spot common to the elytra is, moreover, in most of this Victorian series (especially in the larger examples) evidently less conspicuous.

S. Australia; common in the Port Lincoln district.

L. suturellus, sp. nov. Breviter ovalis; postice parum angustatus; nitidus; piceus vel rufo-piceus; antennis, palpis, prothoracis et elytrorum marginibus (sutura inclusa), corpore subtus, pedibusque, testaceis; capite prothoraceque subtilissime confertim (parum perspicue) punctulatis; elytris vix striatis, striis subfortiter punctulatis, interstitiis (præsertim suturam versus) confuse perspicue punctulatis. Long., $\frac{3}{5}$-1 l.: lat., $\frac{1}{3}$ l.-$\frac{3}{5}$ l. vix).

This species may be distinguished from the others known to me by the conspicuous paleness of its suture, which seems to be constant; it may be known from the two preceding by the much more strongly punctured striæ of its elytra and the quite different style of the puncturation of the interstices, which does not vary alternately, but becomes gradually feebler from that nearest the

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suture (where it is nearly as strong as in the striæ) towards the external margin, the interstices between the middle of the elytra and the margin being scarcely visibly punctulate. The sculpture of the elytra is very much as in the European *Phalacrus caricis*, Sturm., the punctures in the striæ and in the inner interstices being about as they are in that species. The punctures in the *striæ* scarcely become feebler towards the lateral margin, nor are they very much finer even close to the apex.

Western Australia.

L. lateralis, sp. nov. Breviter ovalis; postice parum angustatus; nitidus; piceo-niger, capite et elytrorum apice paullo rufescentibus, antennis palpis pedibus et corpore subtus testaceis (his nonnullis exemplis paullo infuscatis); capite prothoraceque confertim perspicue punctulatis; elytris vix striatis, striis subfortiter punctulatis; interstitiis omnibus æque confuse perspicue punctulatis. Long., 1—1⅛ l.; lat., ⅗—⅘ l.

var? *major*; prothorace sat late rufo-cingulato. Long., 1⅘ l.; lat., 1 l.

This species is larger than *L. suturellus*, and is very differently coloured; in shape and sculpture the two are very similar, except in *L. lateralis* having the lateral interstices of its elytra punctured quite as strongly as the interstices near the suture.

South Australia; near Port Lincoln. The var? *major* was taken near Adelaide.

L. frigidus, sp. nov. Sat breviter ovalis, postice parum angustatus; nitidus; antennarum clava, capite, prothoraceque (lateribus rufescentibus exceptis), nigris; elytris rufescentibus hic illic infuscatis; ceteris rufo-testaceis; capite prothoraceque subtilissime confertim punctulatis; elytris vix striatis striis subfortiter punctulatis, interstitiis omnibus obscure punctulatis. Long., 1 l.; lat., ⅗ l.

The most noticeable character of this species is the black club of its antennæ, of which moreover the stem is more slender than in the other species known to me of *Litochrus*, with the seventh joint scarcely, if at all, longer than the sixth. In the other species I have not found any very available antennal distinctive characters, but they all seem to have the seventh joint distinctly longer than the sixth, and also the third conspicuously elongated. The fact is the antennæ (owing to the compression of the apical joints, which seem more convex moreover on one of the compressed faces than the other) appear different in two examples of the same species unless they are absolutely similarly brushed out, and in these minute insects it is difficult to be sure one has attained this result. The puncturation of the elytra in this species is not much different from that of *L. lateralis*, but owing to the ex-

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tremely shining surface and lighter colour of the elytra, the puncturation is less noticeable unless examined under a powerful magnifier.

Victoria; a single example embedded in snow on one of the higher mountains.

LITOCHRUS (?)

The next two species represent a type which can hardly stand as truly congeneric with the preceding, as the tibiæ are devoid of apical spines, and the basal joint of the hind tarsi is shorter than the second. It agrees with *Litochrus* in having the hind tarsi evidently longer than the intermediate, in its metasternum produced to the extent of concealing the mesosternum, and in its subglobular front (and adjacent hind) coxæ, &c., &c. I should have no hesitation in founding a new genus for it were it not that I have not been able to consult the diagnoses of the new American Phalacrid genera already referred to, and it is possible that it may pertain to one of them. I find that in the species before me, the clypeus is somewhat more developed than in the preceding, encroaching somewhat on the labrum.

L. (?) alpicola, sp. nov. Nitidus; subcuneiformis; postice fortiter angustatus; obscure rufo-testaceus, capite prothoraceque subinfuscatis; his leviter sat crebre punctulatis; elytris vix striatis, striis subtiliter perspicue (interstitiis subtilissime seriatim) punctulatis. Long., 1 l.; lat., $\frac{3}{5}$ l.

The most distinctive specific character of this insect seems to be its shape, the sides converging strongly in a curved manner hindward from close to the base of the elytra. The puncturation of the head and prothorax is decidedly less fine than in any of the species of *Litochrus* described above, but it is very faintly impressed.

Victoria; Alpine district.

L. (?) uniformis, sp. nov. Latus; fere rotundus; ferrugineus; sublævis; elytrorum stria suturali postice manifeste impressa. Long., $\frac{4}{5}$ l.; lat., $\frac{7}{10}$ l. (vix).

The whole surface under a powerful Coddington lens shows scarcely a trace of sculpture of any kind—merely the faintest indication of very minute puncturation—except the sutural stria of the elytra, which is moderately defined in the hinder two-thirds of its length. In the example before me all the margins (including the suture) of the elytra are narrowly and obscurely infuscate.

S. Australia; near Adelaide.

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PHALACRINUS (gen. nov.).

A *Phalacro* differt antennarum clava sat laxe articulata, clypeo antice producto labrum obtegente, mesosterno late manifesto a metasterno haud obtecto, coxis anticis minus globosis, tarsis brevibus inter se longitudine sat æqualibus, his vix perspicue 5-articulatis, posticorum articulo 2° quam 1us paullo breviori.

This genus has quite the facies of *Phalacrus*, but as will be seen by the above diagnosis there are structural peculiarities which almost suggest hesitation in placing it in the family *Phalacridæ;* especially the extreme indistinctness of the 4th tarsal joint, and the feeble globosity of the front coxæ.*

P. australis, sp. nov. Nitidus; subcuneiformis; postice fortiter angustatus; testaceus; elytris plus minus infuscatis; sublævis, elytris distincte striatis, striis postice (externis totis) punctulatis, interstitiis postice subconvexis. Long., $1\frac{1}{5}$ l.; lat., $\frac{7}{10}$ l.

The interval between the outermost stria and the lateral margin of the elytron is very wide anteriorly (about two-fifths of the width of the whole elytron); but it narrows hindward very quickly, and is in the hinder half of its length of almost uniform width, and less than half as wide as in front. Each elytron bears 9 striæ, none of which quite reach the base except the 4th, 5th, 6th, 7th, and 8th, and of *these* only the 7th and 8th are more than very faintly indicated close to the base. The striæ become deeper and more strongly punctulate successively from the suture toward the lateral margin, and also from the base hindward, the puncturation of the 3 or 4 striæ nearest the suture being scarcely indicated in front. The 9th stria terminates in front by running rather indistinctly into the 8th considerably behind the base of the elytron, and the 7th and 8th are connected on the base. (In some examples, however, the anterior inflected part of these striæ is scarcely traceable, so that the 8th and 9th striæ seem to terminate independently) The infuscation of the elytra is

* Since writing these remarks I have had the advantage of receiving a communication from Mr. A. Sidney Olliffe, the Colonial Entomologist of N.S.Wales, who has been kind enough to examine a specimen of *P. australis* for me. Mr. Olliffe is a high authority on the Clavicorn genera, whose opinion is much more valuable than mine. He regards what I have taken to be a minute 4th joint of the tarsi as merely a basal dilation of the apical joint, and cannot discover a suture. I have no doubt he is right, and that my observation was incorrect. Apart from this difficulty, Mr. Olliffe would be disposed to refer the insect to the *Phalacridæ*, but regards this objection as a very serious one. However, as it seems to me that *Phalacrinus* would be much more out of place in any other family, I have thought it on the whole best to let it stand where I have placed it, and at the same time to record the notes with which Mr. Olliffe has favoured me.

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variable, it appears never to extend to the portion between the 9th stria and the lateral margin; in some examples it consists merely in the *striæ* being darker than the general colour, and in others it suffuses nearly the whole disc. The sculpture (excluding the punctulate striæ of the elytra) is so fine that the insect may almost be called lævigate, but the space between the 9th stria and the lateral margin is a little more distinctly punctulate than the general surface. On the underside the puncturation is not much more distinct than on the upper surface except on the sides of the metasternum, where it is moderately defined.

S. Australia; Port Lincoln, also near Morgan.

P. obtusus, sp. nov. Latus; postice quam antice parum fortius angustatus; elytrorum striis minus perspicue punctulatis; cetera ut *P. australis*. Long., $1\frac{1}{5}$ l.; lat., $\frac{4}{5}$ l.

The difference of this insect from the preceding in respect of shape strikes the eye at once, this being at its widest scarcely in front of the middle, and being not much more narrowed hindward than in front, while in *australis* the greatest width is considerably in front of the middle, and the front part of the insect is wide and obtuse, with the hinder part strongly narrowed. In *obtusus* none of the striæ are distinctly punctulate, while in *australis* the external striæ are dotted with well-defined isolated punctures.

S. Australia; near Port Lincoln.

P. rotundus, sp. nov. Rotundus; brevis; elytris haud longioribus quam conjunctim latioribus; his margine laterali latissimo, striis minus crebre punctulatis; cetera ut *P. australis*. Long., 1 l.; lat., $\frac{4}{5}$ l.

This species is exceedingly close to the preceding two, but its shape is so distinctly different that I cannot regard it otherwise than as a good species. Its outline is nearly a circle, the elytra down the suture being (by measurement) not at all longer than they are together wide at their widest part; in the preceding two species they are distinctly longer than together wide. The interval between the 9th stria and the lateral margin is in *P. rotundus* distinctly wider than in the preceding two species, especially in its hinder part. The puncturation of the striæ is stronger than in *P. obtusus*, and the punctures are less closely placed than in *P. australis*.

S. Australia; near Port Lincoln.

PHALACRUS.

P. corruscus, Panz. A *Phalacrus* occurring commonly in South Australia, and which I have met with in Victoria also, appears to me incapable of separation from this European species.

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P. Burrundiensis, sp. nov. Breviter obtuse ovalis; convexus; nitidissimus; niger; antennis pedibusque piceis; elytris perspicue striatis, interstitiis puncturis sat subtilibus biseriatim leviter impressis; antennarum clava minus elongata, articulo ultimo præcedentibus 2 conjunctis vix longitudine æquali, apice minus acuminato. Long., $1\frac{1}{5}$ l.; lat., $\frac{4}{5}$ l.

This species is very like *P. corruscus*, Panz., but differs in being an evidently wider insect in proportion to its length, in its more evenly rounded sides—the greatest width of the body being a little behind, rather than at, the base of the elyrta—and in the last joint of the antennæ being scarcely so long as the preceding two together, and being of more conical form, with the apex blunt. The puncturation of the elytra, too, when attentively examined, is seen to be different. In *corruscus* it is fine, close, and even, there being no striæ (except the sutural one), and scarcely a trace of longitudinal arrangement in any part of the puncturation. In the present species the elytra are very feebly striated throughout, the striæ for the most part running in pairs (each pair very close together), and the spaces between the several pairs of striæ (which are much wider than those between the striæ of each pair) bear each two rows of punctures, which are very faintly impressed rather than very fine, but are quite discernible under a good lens. In the example before me the apical joint of the antennæ is obscurely testaceous.

Northern Territory of S. Australia.

OLIBRUS.

O. Victoriensis, sp. nov. Latus; breviter ovalis; nitidus; testaceo-rufus; capite postice et prothorace (lateribus et basi exceptis) obscurioribus; capite prothoraceque subtilissime confertim punctulatis; elytris punctulato-substriatis, interstitiis perspicue minus crebre punctulatis. Long., $1\frac{1}{4}$ l.; lat., $\frac{4}{5}$ l.

This insect seems to possess all the characters of *Olibrus*, the hind tarsi longer than the intermediate, with basal joint shorter than the second, tibiæ having apical spines, &c., &c. Compared with *O. corticalis*, Sch., it is a good deal wider in proportion to its length, and is considerably less attenuated behind, and less convex; the puncturation of its elytra is as strong in the interstices as in the striæ, and is slightly stronger than in *Phalacrus caricis*, Sturm.

Victoria; in the Alpine district.

NITIDULIDÆ.

In recently working through the specimens belonging to this family in my collection, I have been surprised to find how little

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use describers have made of the presence or absence (and the shape) of a piece of the under-surface which is, I suppose, the epimeron of the mesosternum, and which in some genera assumes a remarkable position and form; in *Meligethes (e.g.)* it appears as a triangular plate separating from each other in the front half of their length the metasternum and the metasternal episternum. As I am not quite sure that I am right in deeming it the mesosternal epimeron, I propose in the following descriptions, &c., where I have occasion to refer to this piece, to call it the "intermediate plate," so as to avoid the risk of giving it a misleading name. I have looked through several works on the *Nitidulidæ (e.g.*, Reitter's "Systematische Eintheilung der Nitidularien," the chapter on the "Nitidulaires" in the "Genera des Coléoptères," the corresponding chapter in the "Insecten Deutschlands") without having found any discussion of this character—although I have no doubt it has been remarked by someone, if I could hit the right author. I have not access to a sufficiently large collection of *Nitidulidæ* to be able to say how far this character would be available for purposes of classification in general; but so far as concerns the Australian species and such European and American ones as are respresented in my collection, the interposition of this "intermediate plate" between the metasternum and its episterna, and also its shape when so interposed, appear to be distinctive of genera. I have examined a considerable number of specimens of the following genera, and find this "intermediate plate" in Cychramptodes, Meligethes, Pria, Macroura, Gaulodes, Nitidula, Cychramus, Ips (all well defined); and in Amphotis and Pocadius feebly discoverable; while in the Brachypterides, Carpophilides, Epuræa, Haptoncus, Haptoncura, Soronia, and Omosita I do not find it at all discernible.

Another character that might, I think, be much used with advantage in classifying the *Nitidulidæ* is the degree of coarseness of granulation of the eye. So far as I have been able to investigate the matter the granulation of the eyes in this family is of three distinct types. It is more or less fine in the Brachypterides, Carpophilides, Epuræa, Haptoncus, Haptoncura, Nitidula. Amphotis, Omosita, Meligethes, Pocadius, Macroura, Pria, Ips. In the other genera, viz., Soronia, Gaulodes, Lasiodoctylus, Cychramptodes, Idæthina, Æthinodes, Cychramus, it is coarser; but of those with more coarsely granulated eyes *(i.e.*, with the facets large) some have the individual facets almost flat *(e.g.*, Gaulodes, Cychramptodes), while others have them more or less strongly convex, *Idæthina* (presuming my identification of that genus to be correct) standing pre-eminent in respect of that character.

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HAPTONCURA.

H. Victoriensis, sp. nov. Ovalis; pubescens; testacea, prothoracis disco utrinque, antennarum articulis ultimis 4 vel 5 vel 6, et elytrorum disco, infuscatis; confertissime minus subtiliter punctulata; prothorace quam longiori duplo latiori, antrorsum angustato, antice leviter emarginato, lateribus ab apice ad basin gradatim magis late reflexo-marginatis, angulis posticis bene determinatis retrorsum subproductis. Long., 1⅖ l.—1½ l.; lat., ⅗—⅘ l.

This species has entirely the facies of an European *Epuræa*, but clearly belongs, I think, to the genus (or subgenus) *Haptoncura*. Its pubescence and puncturation scarcely differ from the same in *E. pusilla*, Hbst. Compared with that species it is much less elongate and parallel (more like *E. deleta*, Er., in outline), with the sides of the prothorax much less widely reflexed (especially in front), the elytra less widely margined, tibiæ with apical spines, &c.

Of Australian *Haptoncuræ*, no doubt *imperialis*, Reitt, is its nearest ally. I have not, so far as I know, seen that species (the exact habitat of which is not known), but it evidently differs from it in many characters, of which I may specify the puncturation no doubt much stronger (*imperialis* is said to be "subtilissime punctulata"), the front of the prothorax less strongly emarginate, &c. The colours and markings, too, are evidently different, the prothorax having in *imperialis* on either side a black discal vitta, abbreviated in front; this species an elongate blotch (often almost obsolete), not more abbreviated in front than behind; the elytra in typical specimens of *imperialis* having (among other markings) a large common triangular, basal, dark spot. Of the present species I have seen nothing like this in any specimen, but ordinarily there is a large dark spot occupying the greater part of the disc of each elytron, nearly reaching the suture and lateral margin, and widely separated from the base and apex. This spot is liable to be altogether wanting (rarely), or extended over the whole elytron, except the lateral margin. The females are proportionally much broader and more robust than the males.

Victoria; on flowers in the Alpine district.

H. Lindensis, sp. nov. Ovalis; pubescens; testacea vel rufa; elytris maculatim et corpore subtus, plus minus infuscatis; leviter (in prothorace sat crebre in elytris magis sparsim) punctulata; prothorace quam longiori vix duplo latiori, antrorsum sat angustato, antice subbisinuato, lateribus angustissime reflexo-marginatis, angulis posticis sat rotundatis. Long., ⅘—1⅕ l.; lat., ⅖—⅗ l.

This little species is evidently closely allied to *H. liliputana*,

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but differs *inter alia* in its less closely punctured prothorax, with rotundate-obtuse hind angles. From the two other previously described Australian species, and from *H. Victoriensis*, it differs in the very narrow margins of its prothorax. The infuscation of its elytra (which is never clearly defined) consists of a shading round the scutellum and a vitta down the disc of each elytron, which is dilated near, but does not reach, the apex; this vitta is liable to be broken into several small patches, or even to be scarcely discernible, and in some examples the shading round the scutellum is very faint. In some examples the underside is entirely rufous, in others the metasternum or hind body, or both, may be more or less infuscate. The puncturation, I regret that I cannot compare satisfactorily with that of any well-known species; the prothorax is finely alutaceous, and on this surface it is (by no means closely) pitted with faintly impressed, but not very small, punctures; the punctures on the elytra are still more sparse and faint.

S. Australia; common on flowers near Port Lincoln.

H. Meyrickí, sp. nov. Ovalis; pubescens; testacea vel rufa; elytris et corpore subtus plus minus infuscatis; prothorace confertim sat subtiliter punctulato, quam longiori minus duplo latiori, antrorsum angustato, antice bisinuato, lateribus angustissime reflexo-marginatis, angulis posticis rotundato-obtusis; elytris sparsim leviter punctulatis. Long., 1 l.; lat., ½ l.

This species is very like *H. Lindensis*. I do not find any noteworthy difference in the colours, except that in ordinary types of this the infuscation of the elytra is almost confined to the region of the scutellum, and that the general colour of the elytra is distinctly paler than in *H. Lindensis*. It can be at once distinguished from *Lindensis* by the much closer and less faint puncturation of the prothorax, and from *H. liliputana*, Reitt., by its different colour, less transverse prothorax, &c.

W. Australia; taken by Mr. E. Meyrick.

H. uniformis, sp. nov. Ovalis; vix pubescens; rufo-brunnea vel nigro-brunnea; antennis palpis pedibusque rufis; minus subtiliter subsparsim æqualiter punctulata; prothorace quam longiori minus duplo latiori, antrosum angustato, antice subbisinuato, lateribus angustissime reflexo-marginatis, angulis posticis rotundato-obtusis. Long., 1 l.; lat., ½ l.

The unicolorous dark reddish or blackish brown colour of this species seems to be distinctive, as also its evenly distributed puncturation, which is evidently stronger than in the preceding two species.

Victoria; on flowers in the Alpine district.

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N.B.—As the last three species described above have a considerably different facies from *Epurœa*, owing to the very narrow lateral margins of their prothorax, I should have hesitated to refer them to *Haptoncura*, were it not for their being evidently close allies of *H. liliputana*, Reitter. It will perhaps be well to mention that they possess the characters which in Herr Reitter's tabulation of the *Nitidulidæ* (verh. ver. Brünn, 1873) would refer them to *Epurœa* (from which genus *Haptoncura* has since been separated), viz., prosternum not produced hindward, tarsi dilated, elytra nearly covering the pygidium, labrum emarginate, apex of mandibles simple, and in addition the tibiæ distinctly spined at the apex and other characters distinguishing *Haptoncura*.

The described Australian species may be thus tabulated :—

A. Lateral margins of prothorax widely reflexed.
  B. Elytral markings consisting of a dark vitta ... ... Victoriensis, Blackb.
  BB. Elytra not marked as in *Victoriensis* ... ... { imperialis, Reitt., subquadrata, Reitt.

AA. Lateral margins of prothorax extremely narrow.
  B. Prothorax rectangular at base (colour uniformly testaceous) liliputana, Reitt.
  BB. Hind angles of prothorax more or less roundly obtuse.
    C. Prothorax and elytra differently punctured *inter se*.
      D. Prothorax closely punctured ... Meyricki, Blackb.
      DD. Prothorax faintly and less closely punctured ... Lindensis, Blackb.
    CC. Puncturation of upper surface quite uniform uniformis, Blackb.

NITIDULA.

N. quadripustulata, Fab. This species (doubtless imported) is not uncommon in the neighbourhood of Adelaide. I have not seen any previous notice of its occurrence in Australia.

SORONIA.

S. simulans, sp. nov. Sat late ovalis ; pubescens ; crebre punctulata ; nigro-picea ; prothoracis elytrorumque lateribus (his sat angustis) antennis pedibus et corpore subtus rufescentibus ; prothorace quam longiori plus duplo latiori, antrorsum fortiter angustatis, antice sat fortiter vix bisinuatim emarginato, angulis posticis rectis retrorsum leviter productis ; elytris sub-seriatim punctulatis, interstitiis alternis fulvo-pubescentibus. Long., $2\frac{3}{5}$ l. ; lat., $1\frac{3}{5}$ l. (vix).

Agrees with *Soronia* in all generic characters, I think,—elytra

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almost entirely covering the pygidium, labrum well developed, emarginate, prothorax not overlapping the base of the elytra, prosternum not prolonged in a free process behind the anterior coxæ, tarsi simple, apex of mandibles bidentate.

Of the previously described Australian *Soroniæ*, I have not seen *S. superba*, Reitt., but from the description it is obvious that it is very different from this species—with conspicuous markings on the upper surface; *S. variegata*, Macl., is stated by Mr. Olliffe (from examination of the type) to be a *Neaspis*; *S. amphotiformis*, Reitt., is a very different insect, with very much wider lateral margins, markings on the elytra, &c., &c.

Compared with the European *S. punctatissima*, Ill., the present species (apart from colour and markings) is less elongate, with lateral margins much narrower, anterior angles of prothorax much less produced, surface of prothorax without inequalities, puncturation of upper surface much more distinct and subrugulose, seriate pubescence of elytra very conspicuous, puncturation of under surface much coarser, &c., &c.

The colour and markings are much like those of several Australian *Nitidulidæ* of other genera, *e.g.*, *Lasiodactylus marginatus*, Reitt.

Victoria; Alpine district.

LASIODACTYLUS.

L. marginatus, Reitt. (var. ? *obscurus*). Nigro-piceus vel piceo-rufescens; antennis (nonnullis exemplis clava picea) pedibus et corpore subtus rufis, nonnullis exemplis prothoracis lateribus dilutioribus; supra fortiter sat crebre punctulatus; prothorace quam longiori vix duplo latiori, antrorsum sat angustato, antice leviter emarginato, angulis posticis rotundato-obtusis; elytris subseriatim punctulatis, interstitiis alternis seriatim setulosis; tibiis anticis apice extus dente curvato productis. Long., $1\frac{4}{5}$ l.—$2\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.—$1\frac{2}{5}$ l.

I have not seen a typical example of *L. marginatus*, Reitt., but the specimens before me agree fairly well with the description, except in respect of colour. As I have seen a good many specimens, the variety seems to be deserving of a name, even if it be only a var.

I have described it sufficiently fully to characterise it as a species if it prove to be distinct from *L. marginatus*, as the description of the latter is wanting in detail—the puncturation, for instance, merely being called "close, and on the elytra irregularly seriate," without any indication whether it is fine or coarse. I do not know any familiar Australian *Nitidulid* with which the puncturation of the present form can be profitably compared. It is not unlike the prothoracic puncturation of *Macroura deceptor*,

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Blackb., but this information will not be of much value to most Coleopterists; it is, however, in character very similar to the puncturation of the common European *Ips ferrugineus*, Fab., but is very much closer, the whole upper surface being quite as closely punctured as the *head* of *Ips ferrugineus*.

The "intermediate plate" on the under surface is moderately large, and is equilaterally triangular in shape.

Queensland.

IDÆTHINA.

The following species is so near absolute agreement with Herr Reitter's characters for this genus that I do not think it would be desirable to give it a new generic name merely on the ground of some slight discrepancies. These are that the mesosternum is (not "scarcely," but) *not* carinate, and that the prosternum is not prolonged behind the front coxæ in a distinct process. The structure of the prosternum is not mentioned in Herr Reitter's diagnosis of the genus, but from its being placed near *Æthina* and *Lasiodactylus* the presence may be inferred of at least the "small pin-point-like process" attributed to those two. This, however, I have not been able to detect in the example before me, the prosternum being bent down behind the anterior coxæ almost exactly as in *Soronia*. It is possible, however, that this may be the case in *Idæthina*, as otherwise it is difficult to understand why its author has separated it from *Lasiodactylus*, as all the characters given are also attributed to *Lasiodactylus*, except the labrum being very short, and this latter character seems a very feeble one on which to found a genus. The claws of *Idæthina* are said to be "simple;" the claws of the specimen before me are certainly not dentate, but they are slightly dilated at the base—not, however, to an extent that seems inconsistent with their being called simple. It is possible that Herr Reitter, if he saw this insect, would give it a new generic name. I may add that the eyes of this insect are more strongly and coarsely granulate than those of any other *Nitidulid* known to me. The piece of the undersurface which I have called the "intermediate plate" (*vide* p. 102) is very large and well defined, almost as in *Meligethes*.

I. cincta, sp. nov. Late subcylindrica; subnitida; sat longe fulvo-pubescens; rufus, prothoracis et elytrorum singulorum disco infuscato; prothoracis elytrorumque marginibus et tibiarum posteriorum 4 marginibus externis dense ciliatis; prothorace quam longiori fere duplo latiori, minus subtiliter sat crebre subrugulose punctulato, antrorsum fortiter angustato, antice emarginato, angulis posticis rectis, lateribus anguste marginatis; elytris postice singulatim late rotundatis pygidii dense pubescentis basin tegentibus, seriatim pube-

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scentibus, leviter striatis, striis minus subtiliter punctulatis apicem versus vix profundioribus, interstitiis vix perspicue punctulatis; corpore subtus leviter sat crasse punctulato. Long., 2 l.; lat., 1 l.

Besides difference in colour, this species seems to differ from *I. Deyrollei*, Reitter, *inter alia*, by its striate elytra and more strongly punctulate prothorax.

S. Australia; taken by Mr. McDougall near Victor Harbour.

MACROURA.

Of this genus I have three species before me. One of them (from Western Australia and the Port Lincoln district of South Australia) is, I think, *M. brunnescens*, Reitt., the exact habitat of which has not, so far as I can ascertain, been previously recorded. It agrees with the description in every respect, except that the author does not mention the sutural angles of the elytra being rounded off so as to show a small piece of the propygidium. In his description of the Indian *M. meligethoides*, Herr Reitter mentions the presence of this character, and therefore his omission to mention it in describing *M. brunnescens* seems to imply its absence, but in all other respects the insect agrees so well with the description that I think the omission is probably accidental.

M. deceptor, sp. nov. Late ovalis; vix nitida; aureo-pubescens; piceo-nigra, labro ore antennis pedibus elytrorumque apice summo rufis; prothorace quam longiori duplo latiori, antrorsum sat angustato, antice leviter emarginato, fortiter sat crebre punctulato, angulis posticis rectis retrorsum sat productis; elytris apice singulatim rotundatis (propygidium in medio aperientibus), sat fortiter vix regulariter striatis, interstitiis ruguloso-punctulatis et seriatim minus perspicue aureo-pubescentibus; pygidio ruguloso. Long., $1\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l.

Remarkably like a large *Meligethes;* the very strong and not very close puncturation of the prothorax, separately rounded (not truncate) apices of the elytra, the red apex of the elytra and the red antennæ will in combination distinguish this species from all its described congeners.

Northern Territory of South Australia.

M. Baileyi, sp. nov. Late ovalis; subnitida; aureo-pubescens; atra, antennarum basi pedibusque rufescentibus; prothorace quam longiori duplo latiori, antrorsum fortiter angustato, antice bisinuato, crebre sat fortiter punctulato, angulis posticis rectis retrorsum sat productis; elytris apice singulatim late rotundatis (propygidium in medio aperientibus), sat fortiter sat regulariter striatis, interstitiis rugulosis et seriatim aureo-pubescentibus; pygidio reguloso. Long., $1\frac{3}{5}$ l.; lat. $\frac{4}{5}$ l.

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Resembles the preceding species, but differs in colour and in the evidently closer and less strong puncturation of the prothorax, which is about as strong as (and somewhat closer than) that of the prothorax of the European *Brachypterus urticæ*, Fab. Of the previously described species *M. brunnescens*, Reitt., and *nigra*, Reitt., are considerably larger, the former (as also *M. densita*, Reitt,) having the prothorax very much more finely punctured, and the latter—besides having the prothorax more finely punctured (as I should judge from the description)—having black pubescence and elytra truncate at the apex.

Queensland; taken on Mount Bellenden-Ker by F. M. Bailey, Esq. (of botanical fame).

ÆTHINODES (gen. nov. *Nitidulidarum*).

Labrum transversum emarginatum; antennarum clava magna fortiter compressa, articulis fortiter transversis; oculi parvi fortiter prominentes fortiter granulati; prothorax elytrorum basin haud tegens; elytra pygidium fere totum tegentia; prosternum pone coxas breviter productum et abrupte in apicem acutum retrorsum angustatum; tarsi modice dilatati; unguiculi basi dente obtuso armati; corpus ovale pubescens; mesosternum carinatum.

I cannot ascertain that any genus has been described hitherto to which an insect presenting the above characters could be referred without a likelihood of causing confusion, and therefore I am obliged to give a new name.

The piece of the undersurface which I have called the "intermediate plate" is very distinct; it is narrow and elongate, much as in *Gaulodes*, and not unlike the corresponding piece in *Ips*. Other characters that seem likely to be generic are great elongation of the third joint of the antennæ, as compared with the following joints, and the disappearance of the third and fifth rows of pubescence on the elytra considerably before the apex.

I think the position of this genus will be near *Lasiodactylus* and *Æthina*, which have a very similar prosternal process—broad immediately behind the coxæ, and then narrowed to an apical angle very abruptly, so that the part behind the coxæ is triangular, and yet very short. I have not been able to examine the mandibles. The tarsi are dilated a little more strongly than in *Amphotis*. The eyes resemble those of the European *Cychramus luteus*, Kug., but are smaller, and even more prominent.

Æ. marmoratum, sp. nov. Late ovale, postice sat angustatum; sat nitidum; pubescens; rufo-ferrugineum, prothorace elytrisque maculatim infuscatis; prothorace quam longiori duplo latiori, minus subtiliter minus crebre punctulato,

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antrorsum sat fortiter angustato, antice emarginato, angulis posticis acute rectis retrorsum subproductis, lateribus minus anguste reflexo-marginatis; elytris postice singulatim rotundatis, fere ut prothorax punctulatis (sed puncturis subseriatim dispositis), seriatim pubescentibus, apicem versus seriebus 1ª 2ª 4ª que in carinis elevatis, 3ª 5ª que obsoletis. Long., $1\frac{1}{6}$ l.; lat., 1 l.

Besides the apical part of the first, second, and fourth rows of pubescence, the parts of the sixth and seventh immediately behind the middle seem to be a little elevated.

In the example before me the infuscation on the disc of the prothorax is blotchy and very ill-defined, while that on the elytra is very distinct, consisting of a large common basal triangle and a number of small spots, the largest of which are on either side of the suture near the apex.

Tropical Australia; I am not sure of the exact locality.

THALYCRODES (gen. nov. *Nitidulidarum*).

Labrum bilobum; antennarum clava ut *Thalycræ;* oculi sat magni sat prominentes modice granulati; prothorax elytrorum basin haud tegens; elytra pygidii partem tegentia; prosternum ut *Lasiodactyli;* mesosternum subtiliter carinatum; tibiæ omnes extus dentibus spinulisque armatæ; tarsi simplices; unguiculi basi vix compresso-dilatati; corpus pubescens, marginibus dense ciliatis.

The species for which I propose this name cannot be referred to *Thalycra*, on account of their having all their tibiæ strongly armed externally, the claws not truly simple, and the mesosternum traversed longitudinally by an extremely fine elevated line. I cannot help thinking that *Thalycra australis*, Germ., is congeneric with the species before me, and that its author overlooked the extremely fine carina on the mesosternum—indeed, I should have no hesitation whatever in considering one of the insects before me as identical with it specifically if it were not for this difficulty. I have therefore given it the name *australe*, as I am satisfied that, if generically, it is also specifically identical.

The "intermediate plate" on the undersurface of this genus is decidedly large, and forms a triangle. The third joint of the antennæ is, as in *Æthinodes*, longer than the next two together. Unfortunately, I have not been able to compare these species with a specimen of *Thalycra*, and have had to depend upon descriptions of that genus, aided by my memory of it, in making the preceding remarks.

T. australe (? Germ.). Ovale; convexum; sat nitidum; pubescens; ferrugineo-brunneum (elytris nonnullis exemplis obscure testaceo-maculatis); prothorace quam longiori duplo

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latiori, minus subtiliter minus crebre punctulato, antrorsum sat fortiter angustato, antice emarginato, angulis posticis rotundatis lateribus anguste marginatis; elytris postice rotundato-truncatis, vix striatis, striis crebre punctulatis, interstitiis vix punctulatis alternis griseo-pilosis.

var. *tenebrosum;* corpore et antennarum clava nigrescentibus, elytris manifeste testaceo-maculatis. Long., $1\frac{1}{4}$—$1\frac{1}{2}$ l.; lat., $\frac{3}{5}$—$\frac{4}{5}$ l.

The front tibiæ have three blunt teeth placed round the apical external margin; the intermediate tibiæ have their external margin finely spined in its whole length, and there is a large bifid tooth a little before the apex, and a simple sharp one still nearer to the apex; the external margin of the hind tibiæ is finely spined in all its length, and bears close to its apex a long tooth which ends in two spines. The "intermediate plate" is in the form of an equilateral triangle, and is of large size.

The pale markings on the elytra consist of three or four large spots placed at intervals on either side of the suture in the anterior two-thirds of its length, and an additional spot on the base at the shoulder. In ordinary specimens they are scarcely, or not at all, noticeable; in the var. *tenebrosum*, they are very conspicuous.

S. Australia; near Adelaide, also near Port Lincoln.

T. pulchrum, sp. nov. Ovale; convexum; pubescens; ferrugineum, elytris notis infuscatis numerosis maculatis; prothorace quam longiori duplo latiori, minus subtiliter sat sparsim punctulato, antrorsum sat fortiter angustato, antice emarginato, angulis posticis bene determinatis obtusis, lateribus anguste marginatis; elytris postice rotundato-truncatis, leviter striatis, striis crebre punctulatis, interstitiis vix punctulatis alternis griseo-pilosis. Long., $1\frac{2}{5}$ l. (vix); lat., $\frac{3}{5}$ l.

The front tibiæ are strongly crenulate all along their external edge, and have two strong sharp teeth, one at the apex, the other immediately before it; the middle and hind tibiæ are feebly and widely serrate externally, and also bear a series of strong spines, their apex being dilated externally into a kind of blunt tooth, on which are several longer spines. The dark markings on the elytra are very distinct and very intricate. The suture is infuscate, a series of spots forms a kind of festoon from shoulder to shoulder, crossing the suture at about a-third of its length from the base, and on either side sends a branch forward to the base from the middle of its length between shoulder and suture, several spots placed transversely occupy the middle part of each elytron, and the apex is edged with dark-brown, which is continued on either side and then arched forward to the suture so as

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to form a ring intersected by the dark suture on either side of which it thus encloses a patch of the pale ferruginous ground colour. The "intermediate plate" is in the form of an equilateral triangle, but is much smaller than in the preceding species.

S. Australia; near Port Lincoln.

T. cylindricum, sp. nov. Sat elongatum; subparallelum; subcylindricum; piceo-nigrum, capite prothoraceque obscure rufescentibus; antennis (clava excepta) pedibus et elytrorum maculis nonnullis rufis; prothorace quam longiori dimidio latiori, vix subcanaliculato, crebre minus subtiliter subaspere punctulato, antrorsum minus angustato, antice leviter emarginato, angulis posticis rotundato-obtusis, lateribus sat anguste marginatis; elytris postice rotundato-truncatis, leviter striatis, striis crebre punctulatis, interstitiis subrugulosis, alternis griseo-pilosis; oculis minus fortiter granulatis. Long., $1\frac{2}{5}$ l.; lat., $\frac{3}{5}$ l.

Although the subcylindric form and less strongly granulated eyes of this insect suggest considerable doubt as to whether it is rightly placed here, I cannot regard those characters as sufficient foundation for a new genus. The 3rd joint of the antennæ is a little less elongate than in the preceding two species, and on the under surface the "intermediate plate" is considerably narrowed and elongated; the other structural characters seem identical. The red blotches on the elytra are not very strongly defined (having somewhat the appearance of being marked on the inner surface of the elytra, and seen through its substance)—but I have no doubt their brightness is variable. They are very similar to those in some examples of *T. australe*.

The front tibiæ are very like those of *T. pulchrum*, but their crenulations are feebler and they have only a single blunt bifid tooth at the apex; the middle and hind tibiæ are spined externally, and have a bifid tooth close to the apex.

Victoria; in the Alpine district.

TROGOSITIDÆ.

NEASPIS.

N. pusilla, sp. nov. Elongato-ovalis; sat nitida; setulis albidis confuse vestita; picea, antennis basin versus prothoracis elytrorumque lateribus corpore subtus et pedibus plus minus rufescentibus; capite prothoraceque crebre obscure subrugulose punctulatis; hoc quam longiori plus duplo latiori, antrorsum leviter angustato antice leviter emarginato, angulis posticis subrectis retrorsum subproductis, lateribus late marginatis ciliatis subtiliter serratis; elytris sat crasse subrugu-

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lose subseriatim punctulatis lateribus subtiliter ciliatis. Long., $1\frac{1}{3}$ l.; lat., $\frac{3}{5}$ l. (vix).

Very like the common *N. variegata*, Macl., but *inter alia* without any pattern on the elytra, much smaller, more elongate, with the prothorax more transverse and less emarginate in front, with anterior angles scarcely at all produced, and having its lateral margins finely serrate.

South Australia; near Adelaide.

PELTONYXA.

I have before me two species evidently belonging, I think, to this genus, but I cannot identify either of them with the previously recorded *P. Deyrollei*, Reitt., which is a much larger insect, besides differing in several other particulars.

P. australis, sp. nov. Elongata, postice leviter dilatata, minus convexa; vix pubescens; ferruginea, elytris dilutioribus, prothoracis disco utrinque (nonnullis exemplis) nigro-umbrato; capite prothoraceque opacis confertim subtilissime punctulatis; hoc quam longiori duplo latiori, antrorsum parum angustato, lateribus minus rotundatis minus late reflexis, angulis posticis rotundato-obtusis; elytris fortiter seriatim punctulatis, interstitiis alternis vix elevatis. Long., $1\frac{2}{5}$ l.; lat., $\frac{3}{5}$ l.

South Australia; Adelaide district.

P. pubescens, sp. nov. Elongata, postice leviter dilatata, minus convexa; pilis erectis sat elongatis vestita; nigro-brunnea, antennis pedibus et prothoracis elytrorumque lateribus testaceis; capite prothoraceque subtiliter rugulosis; hoc quam longiori duplo latiori, antrorsum parum angustato, lateribus minus rotundatis sat anguste reflexis, angulis posticis rotundato-obtusis; elytris fortiter rugulose subseriatim punctutulatis. Long., $1\frac{2}{5}$ l.; lat., $\frac{3}{5}$ l.

Victoria; under bark of Eucalyptus in the Alpine district.

COLYDIIDÆ.

The determination of the question whether a given insect should be referred to this family or to the *Tenebrionidæ* seems capable of depending merely on the existence or non-existence of a minute basal joint of the anterior four tarsi. *Byrsax*, for instance, was originally placed in the *Colydiidæ* as having tetramerous tarsi, and some years later its author, Mr. Pascoe, reported his having discovered it to be heteromerous, and so transferred it to the *Tenebrionidæ*. I draw attention to the close analogy (even if it be no more) between these families, because I have several new species before me for description, which I refer to the

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Colydiidæ, but with a doubt whether they may not possess—as *Byrsax* is said to do—"a basal (tarsal) joint completely hidden in the cotyloid cavity of the tibia," which I have failed to discover.

DITOMA.

D. pulchra, Blackb. In the Alpine district of Victoria I have met with some examples of an insect which appear to be scarcely specifically distinct from this S. Australian species, although they are smaller and darker than the type. They vary a little in the prominence of the lateral dilatation of the prothorax, and I am not quite sure that they do not represent a distinct species, but I cannot find any invariable character by which to distinguish them. This insect bears a very remarkable general resemblance to *Sparactus interruptus*, Er.

D. torrida, sp. nov. Minus depressa; minus nitida; glabra; ferruginea; capite postice prothoracis disco et elytrorum maculis numerosis (his fascias 4 irregulares formantibus) obscure fuscis; prothorace granulato, utrinque bicostato et inter costas internas basin versus carinis 2 arcuatis instructis, costis et marginibus lateralibus (his late reflexis) subtiliter crenulatis, angulis omnibus acutis; elytris singulis carinis 5 valde elevatis instructis, interstitiis crasse biseriatim punctulatis. Long., $2\frac{1}{2}$ l. (vix); lat., $\frac{4}{5}$ l.

This species must be near *D. serricollis*, Pasc.; in that species, however, *inter alia*, the upper surface appears to be of a uniform dark-brown colour—the prothorax to be simply bicostate on either side instead of having a short arched additional costa looped on to each of the inner costæ near the base—and the head to be trilobed in front, whereas the head of the present species is rotundate-truncate in front, very much as that of the European *D. crenata*.

N. Queensland; in the collection of C. French, Esq.

D. nivicola, sp. nov. Minus depressa; subnitida; setis suberectis minus crebre vestita; brunneo-nigra; antennis, capite antice, prothoracis lateribus, elytrorum maculis parvis nonnullis (his testaceo-pubescentibus) et pedibus, rufis; capite prothoraceque crebre granulosis; hoc minus inæquali, lateribus fortiter serratis a basi antrorsum gradatim magis fortiter dilatatis antice valde productis; elytris striatis crasse subseriatim rugulose punctulatis. Long., $1\frac{3}{5}$l.; lat., $\frac{3}{5}$l. (vix).

The colours and markings of this species are much like those of *D. hilaris*, Blackb., but the latter is a considerably narrower and more elongate insect, with the prothorax much less dilated laterally, the elytra less coarsely sculptured, &c.

Victoria; Alpine district, under the bark of a *Eucalyptus* standing in a snowdrift.

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SARROTRIUM.

S. australe, sp. nov. Elongatum; nigrum; antennis squamis griseo-ferrugineis vestitis, pedibus ferrugineis, elytris fasciis 2 rufis ornatis; capite utrinque pone oculos spina armato; prothorace antrorsum angustato, angulis anticis lateraliter subspinosis; elytris profunde punctulato-striatis, longitudinaliter 3-costatis, costis externis pone medium sinuatis. Long., 2 l.; lat., $\frac{3}{5}$ l. (vix).

Several genera of *Tenebrionidæ (e.g., Elascus)* have been described, the remarkable similarity of which to *Colydiid* genera has been remarked on. I at first supposed this present species to pertain to one of them, but on careful examination I find that it does not; with the aid of a compound microscope I feel sure that it is not heteromerous; it can be so only if there is a very minute basal joint of the anterior tarsi so imbedded in the cotyloid cavity of the tibia as to be discoverable only by dissection, which I have not been able to employ, having only a single example. The fasciæ on its elytra are of a bright red colour; one of them commences a little behind the shoulder on the margin and runs obliquely to the suture a little in front of the middle, the other being subapical and straight. The short lateral spine into which the antennal orbit is drawn out behind the eye is a very distinctive character. The head and prothorax are extremely like those of *Sarrotrium clavicorne*, and the antennæ are almost exactly like the antennæ of that species, though a little less stout.

It may be remarked that the specimen before me is in its structural characters extremely like the figure of *Latometus pubescens*, Er. (Wiegm. Arch., 1842, I., tab. 5, fig. 3); it is, however, evidently much narrower and more elongate, and moreover the figure represents *Latometus* as having all the five joints of the anterior four tarsi quite well defined.

Victoria; in the Alpine district.

MERYX.

M. æqualis, sp. nov. Elongata; parallela; supra æqualis; subnitida; subreticulatim albido-pubescens; capite prothoraceque confertim subtiliter punctulatis; hoc postice minus angustato, lateribus crenulatis; elytris sat fortiter vix seriatim punctulatis, vix manifeste 3-costatis; antennarum articulis ultimis 2 quam 9us nonnihil brevioribus; palporum maxillarum articulo ultimo apice oblique truncato. Long., $3\frac{1}{8}$—4 l.; lat., 1—$1\frac{2}{8}$ l.

The whitish pubescence is very inconspicuous on the prothorax; on the elytra it is very distinct, but not very sharply limited; it forms a reticulated pattern somewhat like the reticulation formed in the previously described species by costæ. Compared with

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M. illota, Pasc., the present species is less opaque, its prothorax is less narrowed behind, and its antennæ are longer, more slender, and less incrassate towards the apex, with the apical two joints distinctly though not much shorter than the preceding joints; the last joint of the maxillary palpi is a little more sharply triangular than in *M. illota*.

South Australia; near Port Lincoln, under bark.

SPARACTUS.

This genus is remarkably like *Ditoma* superficially, but may be at once distinguished by the 3-jointed club of its antennæ. A species occurring not uncommonly in S. Australia and Victoria agrees very well with the description of *S. interruptus*, Er., the only species named up to the present time. The following seem to be new:—

S. pustulosus, sp. nov. Opacus; niger, antennis pedibus prothoracis lateribus elytrorum basi et corpore subtus obscure rufescentibus; supra granulatus; capite angulos 4, prothorace processus serratos 3, utrinque formantibus; horum antico permagno antrorsum curvato-producto; prothorace supra tuberculis conicis instructo; elytris 3-seriatim tuberculatis. Long., 2 l.; lat., $\frac{4}{5}$ l.

S. Australia; common under bark of Eucalyptus in various localities.

S. elongatus, sp. nov. Opacus; niger, antennis pedibus capite antice prothoracis lateribus et corpore subtus rufescentibus; supra granulatus; capite quadrato, antice rotundato-truncato, lateribus reflexis; prothorace antice fortiter bisinuato, lateribus leviter sinuatis late reflexis crenulatis, disco tuberculis parvis nonnullis instructo; elytris obscure 3-seriatim tuberculatis. Long., $2\frac{1}{3}$ l.; lat., 1 l. (vix).

S. Australia; Port Lincoln district.

S. proximus, sp. nov. Opacus; niger, capite antice antennis pedibusque rufescentibus; supra granulatus; capite fere ut *S. interrupti*, Er., sed angulis subanticis rotundatis; prothorace inæquali, antice dilatato, margine crenulato; elytris 3-costatis, costis interioribus interruptis. Long., $1\frac{3}{5}$ l.; lat., $\frac{3}{5}$ l. (vix).

Very like *S. interruptus*, Er., but differently coloured and sculptured, the upper surface (except the reddish front of the head) being unicolorous; the inner two costæ on each elytron being less frequently, and less widely, interrupted (so that they appear much less like a series of tubercles); and the hinder of the two angles of the sides of the head being quite rounded off. In both these species the upper surface of the head is flattish and

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more or less quadrate, but very close to its front margin is suddenly contracted into an extremely short parallel-sided prolongation; in both, the sides and front of this terminal piece meet in sharp angles, and in *S. interruptus* there is also a well-defined angle at the point where the head is contracted, while in *S. proximus* this part is rounded off.

S. Australia; near Adelaide.

S. costatus, sp. nov. Opacus; niger, pedibus plus minus piceis, antennis tarsis et corpore subtus obscure rufescentibus; supra granulatus; capite prothoraceque fere ut *S. interrupti*; elytris 3-costatis, costis haud interruptis. Long., $1\frac{1}{5}$—$1\frac{3}{5}$ l.; lat., $\frac{2}{5}$—$\frac{3}{5}$ l.

S. Australia; widely distributed, and not rare.

The following is a tabulation of the described species of *Sparactus*:—

A.	Elytra with all their costæ entire ...	costatus, Blackb.
AA.	The inner two costæ interrupted.	
	B. The subapical angles of the head rounded...	proximus, Blackb.
	BB. The subapical angles of the head well defined	interruptus, Er.
AAA.	All the costæ broken up into tubercles.	
	B. Prothorax simply sinuate in lateral outline	elongatus, Blackb.
	BB. Lateral margin of prothorax cut into large and conspicuous processes	pustulosus, Blackb.

BOTHRIDERES.

B. Victoriensis, sp. nov. Nitidus; prothorace fortiter punctulato, disco late depresso, medio vix elevato; niger; antennis pedibusque piceo-rufis, elytris fulvo-castaneis; his striatis, interstitiis subconvexis obscure punctulatis inter se æqualibus. Long., 2 l.; lat., $\frac{3}{5}$ l.

Very like the common *B. vittatus*, Newm. Compared with it, the head does not differ noticeably—the prothorax is a little more elongate (being quite as long as wide) with the discal impression less marked—the elytra have not the sutural dark stripe, and their interstices are very different (the second being as wide as the first and third, and all of them being slightly convex). I do not think this species can be identical with *B. musivus*, Pasc., which, however, it, perhaps, somewhat approaches; its colour seems to be very different, and also I cannot find any elytral sculpture agreeing with that attributed to *B. musivus*, which is said to have "three lateral alternate interstices costæform."

Victoria; Alpine district.

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B. merus, Pasc. This species is not very intelligibly described. In the author's tabulation of the genus it is placed as "subopaque," but in the description it is called "subnitid." It is further distinguished from *B. musivus* by several characters, and it is added, "in both the elytra are less deeply striated," suggesting the enquiry, "less deeply than what?" Perhaps words may have been omitted by a printer's error.

I have before me a species which occurs not uncommonly under bark of *Eucalyptus* in the Alpine district of Victoria, which, I think, is probably *B. merus*; it is a trifle less nitid than is usual in the genus, and seems to agree with Mr. Pascoe's description, such as it is. The longitudinal convexity down the centre of the depressed space on the prothorax is, however, a little better defined than the description would lead one to expect. It is remarkable for its very small narrow head, a character not referred to by the author of *B. merus*. It has the third elytral interstice much narrower than either the second or fourth, a character which at once distinguishes it from *B. Victoriensis*. Of the other species having prothoracic sculpture of similar character, *musivus*, Pasc., seems to be larger, and to have "three lateral alternate interstices costæform" (*sic*); *costatus*, Blackb., has elytra very differently sculptured; *vittatus*, Newm., has a much wider head, different colours, &c.

CUCUJIDÆ.

SILVANUS.

S. armatulus, sp. nov. Minus elongatus; sat convexus; pubescens; ferrugineus; prothorace quam longiori vix latiori, crebre subtiliter rugulose punctulato, supra æquali, lateribus fortiter 6-dentatis; elytris punctulato-striatis. Long., 1 l.; lat., $\frac{3}{10}$ l.

Not unlike *S. advena*, Kunz, in outline and convexity, but with the prothorax more elongate, narrower (especially behind), and armed at the sides with six strong teeth.

Victoria; Alpine district.

S. monticola, sp. nov. Sat elongatus; sat convexus; pubescens; ferrugineus; capite prothoraceque obscuris; hoc quam longiori haud latiori, confertim subtiliter vix rugulose punctulato, supra æquali, lateribus subrectis subtiliter sat crebre denticulatis, ad angulos anticos dente majori instructis; elytris punctulato-striatis. Long., 1 l.; lat., $\frac{3}{10}$ l. (vix).

Very like the preceding species, but narrower and more elongate, with the sides of the prothorax very differently sculptured.

Victoria; under bark of *Eucalyptus* in the Alpine district.

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CRYPTOPHAGIDÆ.

CRYPTOPHAGUS.

C. Lindensis, sp. nov. Oblongo-ovalis; sat convexus; ferrugineus; pube fulva minus brevi vestitus; prothorace transverso, confertim sat fortiter rugulose fere confluenter punctulato, supra æquali (nihilominus trans basin depresso), lateribus ante medium leviter rotundato-dilatato; antennarum clava 3-articulata, articulis minus fortiter transversis. Long., 1 l. (vix); lat., $\frac{3}{10}$ l.

This little species seems to be a true *Cryptophagus*, and I cannot identify it with any described species, though it is, I think, rather close to *C. pubescens*, Sturm., but *inter alia* it has no trace whatever of the angular dilatation which that species presents in the middle of the lateral margin of its prothorax.

Compared with *C. affinis*, Sturm. (the only species of the genus previously recorded as found in Australia), the present insect is considerably smaller and narrower; its puncturation is markedly closer on the prothorax, and a little less close on the elytra; the sides of its prothorax are straight and parallel from the base to beyond the middle, their front part having the lateral strongly margined dilatation so characteristic of *Cryptophagus*, but this is not quite so strong as in *C. affinis;* the antennæ are not quite so stout as in *C. affinis*, and their club is different, its joints being about equal in width, the first and third only slightly transverse, the second shorter than the other two, and moderately strongly transverse, but much less strongly so than either the first or second in *C. affinis*.

S. Australia; Port Lincoln district, under bark of *Casuarina*.

ATOMARIA.

Although I cannot find that any Australian species of this genus have been described, the genus is well represented in Australia. The following are among the species in my collection :—

A. australis, sp. nov. Ovalis; convexa; pubescens; sat fortiter sat crebre æqualiter punctulata; subtus nigra, supra ferruginea; elytris pone medium nigro-fasciatis, antennis pedibus que rufescentibus; prothorace transverso subquadrato, basi haud marginato, ante basin utrinque fovea profunda rotundata impresso; antennis basi sat distantibus. Long., 1 l.; lat., $\frac{2}{5}$ l.

South Australia; widely distributed.

A. Lindensis, sp. nov. Oblonga; sat convexa; pubescens; rufo-ferruginea, capite prothoraceque piceis; minus fortiter punctulata; prothorace elytris sat angustiori, subquadrato, basi haud marginato, ante basin utrinque fovea obsoleta rotundata

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impresso, minus crebre punctulato; elytris sat crebre punctulatis; antennis basi sat distantibus. Long., 1 l.; lat., $\frac{3}{10}$ l.

Var. capite prothoraceque ferrugineis.

This species is very like the European *A. badia*, Er., from which it differs in its antennæ less approximate at their base, the prothorax not so much narrower than the base of the elytra, and the puncturation of the elytra considerably closer and finer.

South Australia; Port Lincoln district; among fallen leaves.

LATHRIDIIDÆ.

CORTICARIA.

C. australis, sp. nov. Oblonga; convexa; sat nitida; sat dense (in elytris lineatim) pubescens; fusco-brunnea; antennis (clava excepta) pedibusque dilutioribus; capite prothorace parum angustiori; oculis magnis prominulis; prothorace leviter transverso, crebre sat fortiter (æque ut caput) punctulato, ante basin sat profunde arcuatim impresso, impressione in medio leviter foveata, angulis posticis rotundato-obtusis; elytris quam prothorax vix fere duplo latioribus, vix striatis, puncturarum sat magnarum seriebus crebris instructis, his apicem versus vix obsoletioribus. Long., $\frac{4}{5}$ l.; lat., $\frac{3}{10}$ l.

Very like the European *C. gibbosa*, Herbst., differing chiefly by the presence of a well-defined round fovea in the middle of the transverse sulcus on the prothorax, and by the closer rows of punctures on the elytra, which are not placed in distinct striæ, and between which the interstices are perfectly flat throughout.

S. Australia and Victoria.

C. Adelaidæ, sp. nov. Oblongo-elongata; sat nitida; sat dense (in elytris lineatim) pubescens; testaceo-brunnea; antennarum clava picea; capite prothorace sat angustiori; oculis sat magnis sat prominulis; prothorace sat fortiter transverso, crebre subtilius punctulato, ante basin fovea rotunda instructo, angulis posticis bene determinatis, elytris quam prothorax sat latioribus, subtiliter striatis, striis crebre subtiliter punctulatis, sculptura apicem versus vix obsoletiori. Long., $\frac{4}{5}$ l.; lat., $\frac{3}{10}$ l.

Resembles the European *C. elongata*, Gyll., differing chiefly in the piceous club of its antennæ, its more strongly punctulate prothorax, the perfectly flat interstices of its elytra, and its somewhat less parallel form.

S. Australia; widely distributed.

C. Lindensis, sp. nov. Breviter ovalis; sat nitida; sat dense (in elytris lineatim) pubescens; rufo-testacea; antennis apicem versus obscurioribus; capite quam prothorax parum angus-

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tiori; oculis sat magnis sat prominulis; prothorace fortiter transverso, crebre fortius subrugulose punctulato, ante basin sat profunde arcuatim impresso, impressione in medio foveata, angulis posticis obtusis; elytris prothorace fere duplo latioribus, striatis, striis puncturis sat magnis instructis, apicem versus vix obsoletis. Long., $\frac{7}{10}$ l.; lat., $\frac{3}{10}$ l.

This species is of the short broad form of *C. curta*, Woll., which it resembles also in respect of sculpture, differing, however, in the strongly marked transverse furrow of its prothorax; its sculpture is much stronger and coarser than those of the two species described above.

S. Australia; Port Lincoln district.

C. Andersoni, sp. nov. Oblongo-elongata; sat nitida; sat dense (in elytris lineatim) pubescens; supra testaceo-brunnea, subtus piceo ferruginea; capite prothorace parum angustiori, oculis sat magnis sat prominulis; prothorace leviter transverso, minus crebre profunde nec subtiliter punctulato, ante basin transversim arcuatim sulcato, angulis posticis rotundatis; elytris prothorace duplo latioribus, subtilissime striatis, striis subtiliter punctulatis, sculptura apicem versus vix obsoletiori; antennis pedibusque testaceis, illarum clava vix infuscata. Long., $\frac{3}{5}$ l.; lat., $\frac{3}{10}$ l. (vix).

This minute *Corticaria* differs from all the preceding in having a very strongly marked transverse sulcus on the hind part of the prothorax, without any round fovea. The puncturation of the prothorax is also distinctive—rather coarse, but not deep, nor very close.

S. Australia; Port Lincoln district. Named after my friend, Mr. J. Anderson, of Port Lincoln.

C. alutacea, sp. nov. Nigro-picea, antennarum basi pedibusque paullo dilutioribus; lineari-elongata; subdepressa; fere glabra; alutacea; capite prothoraceque parce punctulatis, hoc basin versus angustato, ante basin fovea magna profunda impresso, angulis posticis obtusis bene determinatis, lateribus minute nec crebre denticulatis; elytris pygidio haud plane tegentibus, subtilissime seriatim punctulatis, antennarum clavæ articulis brevibus. Long., $\frac{1}{2}$ l.; lat., $\frac{1}{3}$ l. (vix).

This species must be extremely close to *C. subtilissima*, Reitt., but appears to differ from it in having the hind angles of the prothorax very well defined, and the joints of the antennal club different, the basal two being quite strongly transverse, and the apical one elongate-globose—all three of equal width *inter se*. The fine denticulation of the sides of the prothorax is scarcely noticeable without the use of a compound microscope.

S. Australia; in several localities.

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MYCETOPHAGIDÆ.

TRIPHYLLUS.

T. intricatus, sp. nov. Subovalis, postice angustatus; pubescens; rufo-ferrugineus; elytris 3-fasciatim nigro-notatis; prothorace fortiter transverso, antrorsum fortiter angustato, confuse dupliciter punctulato, postice utrinque impresso, angulis posticis sat acutis; elytris leviter striatis, striis sat fortiter punctulatis, interstitiis vix convexis leviter nec crebre nec subtiliter punctulatis. Long., $1\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l. (vix).

The dark markings on the elytra are intricate and a little variable. They consist of three zig-zag fasciæ, which do not usually reach the lateral margins (the intermediate fascia does so in some examples), the hinder two, or even all three, being indistinctly connected with each other at their lateral extremities in some examples. One of these fasciæ is basal, and is often reduced to a mere blotch on each side the scutellum; the next is median; the last is ante-apical, but in many specimens is dilated hindward so as nearly to reach the apex itself.

Victoria; a few specimens occurred in fungi on a mountain called Baldi, at an elevation of about 6,000 feet.

MYCETÆA.

M. pilosella, sp. nov. Breviter ovalis; subnitida; pilis erectis sat sparsim vestita; ferruginea; prothorace crebre rugulose minus subtiliter punctulato, intra marginem lateralem vix manifeste costato; elytris minus crebre minus fortiter punctulatis; antennis sat elongatis; metasterno minus brevi. Long., $\frac{7}{10}$ l.; lat., $\frac{3}{10}$ l.

This minute species is extremely like the European *M. hirta*, Marsh., superficially. It is a little more elongate and (perhaps consequently) its metasternum is not quite so short; its antennæ are a little longer; the lateral costæ of the prothorax are almost obsolete; the hind coxæ are not quite so widely separated; the puncturation of its prothorax is closer, and that of its elytra is both finer and closer. At a casual glance, it might pass for a small form of *M. hirta*.

S. Australia; in fungi near Port Lincoln.

DIPLOCŒLUS.

D. angustulus, sp. nov. Angustus; parallelus; ferrugineus; pilis erectis vestitus; prothorace transverso, retrorsum leviter angustato, sparsim sat fortiter punctulato, utrinque intra marginem leviter bicostato; elytris punctulato-striatis, puncturis subquadratis sat grossis; abdominis segmento basali in medio oblique bistriato; antennarum clavæ articulo 1° quam 2us multo angustiori. Long., 1 l.; lat., $\frac{3}{10}$ l. (vix).

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The elongate parallel form of this little species gives it an appearance very different from that of the European *D. fagi*, Guér., but I cannot find any structural characters to prevent its being placed in the same genus; at any rate, the identity of tarsal and antennal characters, the lateral sculpture of the prothorax, and the oblique striæ of the basal ventral segment diverging hindward from the middle of the front margin are points of resemblance that indicate at least very close affinity between the two insects. The two previously described Australian *Diplocœli* (*ovatus*, Macl., and *piliger*, Reitter), seem to be similar in form to the European species. Herr Reitter says that he has not seen a description of Sir W. Macleay's species, but judges it distinct from his because the name *ovatus* would be unsuitable to the latter. On comparing the descriptions, I should deem it possible that they are identical. In both descriptions the elytra are said to be "strongly punctulate striate," and this character (apart from the shape of the body) will furnish a further distinction from the present insect, in which the elytra are very feebly striate, although the punctures in the striæ are fairly large and strong.

S. Australia; under bark of *Eucalyptus* in various localities.

D. exiguus, sp. nov. Minus angustus; minus parallelus; pubescens; ferrugineus; prothorace postice vix angustato, sparsim sat fortiter punctulato, utrinque intra marginem sat fortiter bicostato; elytris vix striatis, striis puncturis sat magnis subquadratis instructis, his apicem versus obsoletescentibus; abdominis segmento basali in medio oblique bistriato; antennarum clavæ articulo 1° quam 2us paullo angustiori. Long., 1 l.; lat., $\frac{2}{5}$ l. (vix).

This species is not at all unlike *D. fagi*, Guér., in miniature; it differs from the preceding *(D. angustulus)* in its wider and less parallel form, and especially in the ninth antennal joint being (as in *D. fagi)* only moderately narrower than the tenth. *D. piliger*, Reitt. *(? ovatus*, Macl.)—the other described Australian species—is said to have the prothorax closely punctured, the elytra differently coloured, &c.

South Australia; near Port Lincoln.

DERMESTIDÆ.

TROGODERMA.

Two Australian species have been described as members of this genus—*T. riguum*, Er. (from Tasmania), and *T. apicipenne*, Reitter (from "Australia"). The former I am fairly sure that I have not seen, the latter I think I have taken on several occasions. As, however, I am a little doubtful about my identification being correct, it will be wiser not to refer further to Herr Reit-

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ter's species beyond saying that the insect which I take to be it is very distinct from all the following, which appear to be new :—

T. Eyrense, sp. nov. Ovale (feminis subparallelis); obscure nigro- et fulvo-hirtum; nigrum, antennarum articulis 2-6 tibiis tarsis et elytrorum lateribus apiceque plus minus rufescentibus; obscure sat crebre punctulatum; sulcis antennariis profundis bene determinatis, triangularibus, postice clausis.

Mas. Antennarum clava 5-articulata, quam articuli 1-6 conjuncti multo longiori; horum articulis 2-5 minutis æqualibus, 6° quam 5us paullo longiori et sat latiori; clava cylindrica, hujus articulo 1° quam sequentes multo breviori, 2°-4° sat æqualibus, 5° acuminato quam 3us 4us que conjuncti vix breviori; antennis quam prothorax vix brevioribus.

Femina. Antennis paullo brevioribus; clava quam stipes vix longiori, illius articulo ultimo quam præcedens paullo longiori. Long., $1\frac{2}{5}$—$1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.—1 l.

It should be noted that the sixth joint of the antennæ is so intermediate in width between the fifth and seventh that it might almost as well be classed with the club (making it six-jointed) as with the stipes. I have reckoned it as belonging to the latter because its *length* is perhaps more harmonious with that association. There is not any *very great* difference between the antennæ of the male and those of the female; in the latter, however, the club being evidently shorter than in the former, and especially the last joint being shorter as compared with the preceding joints. The pilosity of the upper surface is fairly dense and consists of black and greyish or fulvous hairs intermingled.

South Australia; basin of Lake Eyre.

T. alpicola, sp. nov. Ovale; obscure nigro- et griseo-hirtum; nigrum, antennarum articulis 2-6 (vel 3-6) tarsis et elytrorum apice rufis; obscure minus crebre punctulatum; sulcis antennariis profundis bene determinatis, triangularibus, postice clausis.

Femina (?). Antennarum clava 5-articulata, quam articuli 1-6 conjuncti haud longiori, articulis 3-6 parvis æqualibus, clava ovali, hujus articulis 1-3 ex ordine latioribus, 4° 3° æquali, 5° quam 4us paullo longiori sat angustiori; antennis quam prothorax sat brevioribus. Long., $1\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l.

Although I think the specimens before me are females, I have no hesitation in describing this species, since the differences between the male and female are but slight in all the species known to me that are closely allied to the present one, consisting chiefly in the females being larger than the males, and having the apical joint of the antennæ—or the whole club of the antennæ—some-

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what shorter. Apart from the antennal difference, this insect is extremely close to the preceding, and I do not see much other distinction save in the puncturation being less close, and the tibiæ almost as obscure in colour as the femora.

Victoria; Alpine district.

T. Adelaidæ, sp. nov. Ovale, subelongatum; obscure nigro- et griseo-hirtum; nigrum, antennarum articulis 3-7 tarsisque rufis; sat crebre subaspere punctulatum; sulcis antennariis profundis bene determinatis, triangularibus, postice clausis.

Antennis fere ut *T. Eyrensis* sed maris articulo 6° feminæ articulis 6° 7° que minoribus. Long., $1\frac{1}{5}$—$1\frac{1}{4}$ l.; lat., $\frac{3}{5}$ l.

This species is much like *T. Eyrense* in its antennal structure, but owing to the joints immediately preceding the club (and the first joint of the club itself) being smaller, the club has no appearance of being six jointed in the male, and in the female might almost be regarded as only four jointed, and in both sexes is not quite so cyclindric in form. The uniform black or pitchy black colouring (except the tarsi and the middle of the antennæ) will at once separate this insect from the preceding two, and its close subasperate puncturation (not less close and subasperate on the prothorax than on the elytra) will furnish a further distinction.

South Australia; Adelaide district, &c.

T. Lindense, sp. nov. Late ovale; fulvo-hirtum; piceo-nigrum; antennis pedibusque (femoribus vix infuscatis) testaceis, elytris testaceo-brunneis; capite prothoraceque subtiliter (hoc latera versus crassius), elytris obscure vix crebre punctulatis; sulcis antennariis profundis bene determinatis, triangularibus, postice clausis.

Mas. (?). Antennarum clava 5-articulata, quam articuli 1-6 conjuncti vix longiori articulis 3-6 parvis æqualibus, clava ovali hujus articulis 1° et 2° parvis fere cum stipite numerandis, 3° et 4° sat magnis inter se sat æqualibus, 5° quam 4us paullo longiori vix angustiori. Long., 1 l.; lat., $\frac{3}{5}$ l. (vix).

I believe I have both sexes before me, and that the difference between them is very slight; in one example the apical joint of the antennæ is certainly shorter and more rounded at the apex than in the other. The seventh and eighth joints of the antennæ are very much smaller than the following three, so that the club might almost be regarded as tri-articulate only; but on careful examination I think those two joints really belong to the club, being different in form from the preceding four.

The entirely testaceous antennæ will *inter alia* distinguish this little species from all the preceding.

South Australia; near Port Lincoln.

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T. difficile, sp. nov. Elongato-ovale; obscure nigro- et griseo-hirtum; nigrum, antennarum articulis 3-7 tarsisque rufis; obscure subcrasse (prothoracis disco multo minus crasse) punctulatum; sulcis antennariis minus profundis, postice clausis, lateribus subparallelis.

Mas. (?) Antennarum clava 4-articulata, quam articuli 1-7 conjuncti haud longiori, articulis 3-7 parvis, clava ovali, hujus articulo 1° parvo, 2° et 3° sat æqualibus, 5° quam 4us multo longiori haud angustiori. Long., $1\frac{3}{5}$ l.; lat., $\frac{7}{10}$ l.

The prosternal sulci in this species differ in form from those of the preceding; they are a little wider and less deep, and instead of the sides of each sulcus converging from its open base (on the front margin of the prosternum) continuously till they meet at the hind angle of the prosternum, they run almost parallel to each other for about half their length, and converge only in their hind portion.

The 3rd and following joints of the antennæ are very closely crowded together, and consequently difficult to count; it is only by examination under a high-power that I have satisfied myself as to their number. As in some of the preceding species, the apportionment of joints to the stem and club is no easy matter. At a glance, the club seems to be 3-articulate, but on examination the 8th joint seems clearly to go with those of the club, being evidently much wider than the preceding—but I cannot look upon the 7th joint as a part of the club. The robust apical joint (not at all narrower than the penultimate) gives the antennæ a very distinct appearance. The puncturation of the elytra also is coarser than usual.

S. Australia; near Port Lincoln.

T. Macleayi, sp. nov. Late ovale, postice angustatum; nigro-hirtum; nigrum, antennis tarsis et elytris (macula magna communi discoidali nigra excepta) rufis; obscure vix crebre (prothoracis disco magis subtiliter sat sparsim) punctulatum; sulcis antennariis profundis bene determinatis, triangularibus, postice clausis.

Mas. Antennarum articulis 4-10 pectiniformibus, 3° minuto, 11° compresso-lamelliformi.

Femina. Antennarum articulis 5-10 leviter serratis, 11° ovali apice acuminato. Long., $1\frac{1}{5}$—$1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.—1 l.

The pectinations of the antennæ of the male increase in length to the seventh joint, those of the seventh, eighth, and ninth being about equal *inter se*, each of them about as long as the basal four joints together of the front tarsi, that of the tenth joint is a little shorter. The apical joint is a compressed somewhat piriform lamella scarcely so long as the tenth joint.

South Australia and Victoria; on flowers.

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T. occidentale, sp. nov. Ovale; nigro-hirtum; piceum, antennis tibiis tarsisque testaceis, elytris rufo-brunneis; crebre subaspere punctulatum; sulcis antennariis sat profundis bene determinatis, triangularibus, postice clausis; elytris abbreviatis.

Femina (?). Antennarum clava elongato-ovali 6-articulata, quam articuli 1-5 conjuncti multo longiori, articulis (apicali quam 10us paullo angustiori paullo longiori excepto) ex ordine latioribus.

The third, fourth, and fifth joints of the antennæ are small, and equal or nearly so *inter se*; the club quite distinctly consists of six joints. I am doubtful of the sex of my unique example, but it is probable that the comparative shortness of the apical joint of the antennæ points to its being a female. The elytra are abbreviated, and separately rounded behind, as in *Thaumaglossa*; the other characters are of *Trogoderma*.

West Australia; taken by E. Meyrick, Esq.

T. Baldiense, sp. nov. Elongato-ovale, subparallelum; obscure griseo- et nigro-hirtum; nigrum, antennis tarsisque testaceis, elytris apicem versus macula magna sanguinea utrinque ornatis; obscure vix crebre (prothoracis disco magis subtiliter magis sparsim) punctulatum; sulcis antennariis sat profundis bene determinatis, triangularibus, postice clausis.

Feminæ antennarum articulis 6-10 leviter serratis, 11° ovali apice acuminato. Long., 2 l.; lat., $1\frac{1}{5}$ l.

This species is evidently a near ally of the preceding. My unique example is a female; its antennæ scarcely differ from those of the same sex in *T. Macleayi*, but the slight internal production of the fifth joint which is distinct in the latter is here not traceable. I have no doubt the antennæ of the male are very like those of *T. Macleayi* (male). The large bright red spot near the apex of each elytron is a very distinctive character.

Victorian Alps; crawling on snow on a mountain called Baldi.

T. Yorkense, sp. nov. Ovale; obscure nigro- et griseo-hirtum; nigrum, antennis tibiis tarsisque testaceis, elytris rufo-brunneis; crebre (prothoracis disco obscure sparsim) punctulatum; sulcis antennariis latis leviter impressis, parallelis, postice apertis.

Maris (?) antennarum clava 4-articulata quam articula 1-7 conjuncti subbreviori, ovali, articulo (clavæ) 1° quam sequentes multo breviori et angustiori, 2° et 3° inter se sat æqualibus, 5° vix angustiori, quam 3us 4us que conjuncti vix breviori. Long., $1\frac{4}{5}$ l.; lat., 1 l.

The distinction between club and stem in the elytra is very indeterminate, and some dilatation is discernible in the seventh

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joint; it might be possible therefore to regard the club as five-jointed, but at a casual glance it would pass for being only three-jointed, as the eighth joint is very much narrower and shorter than the ninth. Although this species has altogether the general facies of *T. Eyrense, alpicola*, and their allies, it is very widely distinct from them by the entirely different shape of the prosternal sulci, which are shallow (though perfectly well defined), much wider than the reception of the antennæ requires, parallel-sided or nearly so, and open behind.

S. Australia; Yorke's Peninsula.

T. Meyricki, sp. nov. Ovale; nigro- et albido-hirtum; nigrum, antennarum basi tibiis tarsisque rufo-testaceis, elytris vix rufescentibus; obscure sat crebre punctulatum; sulcis antennariis latis minus fortiter impressis, antice parallelis postice vix manifeste clausis.

Maris antennarum clava 7-articulata, quam articuli 1-4 conjuncti plus duplo longiori, articulis 1-5 ex ordine latioribus, 6° 5° æquali, ultimo quam 5us sat longiori vix angustiori.

Feminæ antennarum clava 5-articulata, quam articuli 1-6 conjuncti vix longiori articulis 1-3 ex ordine latioribus, 4° 3° æquali, 5° 4° latitudine et longitudine æquali, apice rotundato, Long., $1\frac{1}{5}$ l.; lat., $\frac{3}{5}$ l.

The different number of joints in the antennal club of the male and female is unusual, but I think the two specimens before me are certainly the sexes of one species.

W. Australia; taken by E. Meyrick, Esq.

T. antipodum, sp. nov. Elongato-ovale, sat parallelum; nigro-hirtum; nigrum, tarsis rufis, elytrorum apice vix rufescenti; subtiliter sat sparsim punctulatum; sulcis antennariis subobsoletis, latis, obliquis, postice apertis.

Maris antennarum clava 7-articulata, quam articulati, 1-4 conjuncti duplo longiori, sat cylindrica, articulo 1° quam sequentes sat angustiori, ultimo acuminato quam 10us sat longiori. Long., $1\frac{1}{5}$ l.; lat., $\frac{1}{2}$ l.

The third and fourth joints of the antennæ are very minute, and form a slender connection between the basal two joints (which are robust, as in the rest of the species described above) and the cylindric club. The prosternal sulci are very wide and feeble, being not very noticeable, until in a certain light one sees an oblique track running along them and marking the position of the antennæ in repose.

S. Australia; near Adelaide.

T. singulare, sp. nov. Elongato-ovale, sat parallelum; nigro- et griseo-hirtum; fuscopiceum, elytris dilutioribus, antennis tibiis tarsisque testaceis; subtiliter sparsim punctulatum;

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sulcis antennariis subobsoletis, latis, obliquis, postice apertis. Maris antennarum clava 7-articulata quam articuli 1-4 conjuncti plus duplo longiori, cylindrica, articulis 1° et 2° quam sequentes sat angustioribus, ultimo leviter acuminato quam 10us sat longiori. Long., 1 l.; lat., ½ l. (vix).

The third and fourth joints of the antennæ are so minute that they are not very easily observed, and at a glance the antennæ seem to have only nine joints.

This species is very near the preceding, but differs from it (apart from the very different colouring) in the decidedly less stout antennæ and the extreme minuteness of the third and fourth joints of the same. My unique example is considerably abraded, but I can trace indications of the grey pubescence on the elytra, forming two fasciæ, which might perhaps be more distinct in a very fresh specimen.

S. Australia; near Port Lincoln.

The following is a tabulation of the species described above:—

A. Elytra covering (or nearly so) the hind body.
  B. Prosternal sulci sharply defined, triangular, very deep, and strongly closed behind.
    C. Antennæ testaceous or rufous, unicolorous.
      D. Tibiæ testaceous, elytra unicolorous, antennæ simply clubbed... ... ... Lindense.
      DD. Tibiæ piceous, elytra red, with a large common basal black blotch, antennæ pectinated or serrate ... ... Macleayi.
      DDD. Tibiæ black, elytra black, each with a large subapical red spot, antennæ serrate (female, probably pectinate in male) ... ... Baldiense.
    CC. Antennæ with at least the club black, or nearly so.
      D. Elytra black, their apex rufous.
        E. Club of antennæ cylindric in both sexes... ... ... Eyrense.
        EE. Club of antennæ oval (at least in the female)... ... ... alpicola.
      DD. Elytra entirely black ... ... Adelaidæ.
  BB. Prosternal sulci more feeble, not (or scarcely) closed behind.
    C. Species of oval (non parallel) form, antennal club having less than 7 joints.
      D. Antennæ having at least the club black difficile.
      DD. Antennæ entirely rufous ... ... Yorkense.
    CC. Species of oval form, antennal club of male 7-jointed ... ... Meyricki.

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CCC. Species of parallel form, antennal club of male having 7 joints.
D. Antennæ entirely rufous ... ... singulare.
DD. Antennæ having at least the club black antipodum.
AA. Elytra strongly abbreviated ... ... occidentale

ADELAIDIA, *gen. nov.*

Trogodermati affinis sed antennarum clava sat laxe 3-articulata; elytris abbreviatis singulatim rotundatis, propygidio in medio aperto; unguiculis appendiculatis; sulcis antennariis vix perspicuis.

This genus is also near *Thaumaglossa*, which, however, has 10-jointed antennæ, and distinct prosternal sulci for the reception of the antennæ in repose. The antennal club of the species before me consists of joints, none of which are distinctly transverse, the first and third being quite as long as wide, the second scarcely wider than long. *Trogoderma riguum*, Er., must be superficially very like this species—so much so in fact, that I have thought it best to adopt the same specific name.

A. rigua, sp. nov. Late ovalis; pilis erectis nigris et adpressis albis vestita; nigra, antennis pedibusque rufis, prothorace ad latera et utrinque ad basin albo-pubescenti, elytris fasciis tenuibus 4 et macula apicali parva albopubescentibus ornatis (fasciis 1ª basali 2ª antemediana, 3ª postmediana, 4ª subapicali); crebre subtiliter subaspere punctulata.

Feminæ (?) antennarum articulis 1° 2° que sat magnis, 2-7 parvis inter se subæqualibus, clava 3-articulata oblonga quam articuli ceteri conjuncti multo breviori, illius articulis 1° 3° que inter se longitudine æqualibus 2° his breviori. Long., 2 l. (vix); lat., 1 l.

S. Australia.

CRYPTORHOPALUM.

C. Australicum, sp. nov. Late ovale; pilis crebris (his nigris in partibus nigris, rufis in partibus rufis) vestitum; nigrum, subtus vix rufescens, antennis tibiis tarsisque rufis, elytris fascia antemediana et macula apicali rufis ornatis; obscure sat crebre (prothoracis disco vix perspicue) punctulatum. Long., 1—1½ l.; lat., ⅗—⅘ l.

S. Australia; near Port Lincoln.

C. Woodvillense, sp. nov. Ovale; pilis crebris (his nigris in partibus nigris, testaceis in partibus dilutioribus) vestitum; nigrum vel piceo-nigrum, antennis tibiis tarsisque testaceis, elytris fasciis 2 et apice rufo-testaceis; crebre sat crasse sat aspere (prothoracis disco vix perspicue) punctulatum. Long., 1 l.; lat., ½ l.

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The sides of the prothorax bear some scattered whitish hairs. The anterior fascia of the elytra is slightly in front of the middle, and is rather wide and much zigzagged; the hinder fascia is a little narrower and less flexuous, and scarcely reaches the suture. In some specimens there is a faint reddish spot on either side of the scutellum.

The above two species appear to differ from those described by Herr Reitter in having conspicuous red or testaceous fasciæ and markings on the elytra, as well as in the pattern being different. In the species of Herr Reitter the markings appear to be caused by differently coloured pubescence on a unicolorous ground; in two of them these markings consist of *three* fasciæ, besides basal and apical spots, while in the other they consist of basal spots and a single median fascia.

The present species differs from *C. Australicum* not only in the pattern on its elytra but in its smaller size and much coarser sculpture.

S. Australia; Woodville.

C. interioris, sp. nov. Ovale, lateribus parum rotundatis; pilis crebris (his in elytris nigris in partibus nigris albis in partibus dilutioribus, in prothorace albis) vestitum; piceo-nigrum, antennis pedibusque testaceis, femoribus vix infuscatis, elytris maculis magnis testaceis nonnullis ornatis; sat crebre sat subtiliter subaspere punctulatum; antennarum clava minus dilatata, articulis 2 mox pone clavam vix a clava distinctis. Long., 1—1⅖ l.; lat., ½—7/10 l.

The comparatively small size of the antennal club and the increase in width of the eighth and ninth joints, making them appear almost as belonging to the club, are perhaps a little inconsistent with this genus, but the club is in other respects quite normal, and all the other characters are as in typical *Cryptorhopalum*. Joints 3-9 of the antennæ are extremely short, 8 and 9 scarcely longer, though evidently wider than the preceding joints; 10 is as long as the preceding three together, and much wider; 11 is very much longer and wider than 10, and is rounded.

The pattern on the upper surface is very intricate. The prothorax is much clothed with longish white hairs. Each elytron bears five large testaceous spots, of which one is close to the scutellum, one behind the shoulder, one near the suture in front of its middle (this and the spot behind the shoulder are in some examples obscurely joined into a fascia), one a little in front of the apex on the disc, and 1 *at* the apex (the apical two are in some examples obscurely joined into a vitta). The white hairs on the elytra are not strictly limited to the testaceous parts, but seem to form an independent pattern in three ill-defined fasciæ

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(basal, median and subapical), and are also sprinkled over the apex.

S. Australia; basin of Lake Eyre.

ANTHRENUS.

A. Museorum, Fab. This species is recorded as Australian in Mr. Masters' Catalogue. I have not seen an Australian example of it.

A. varius, Fab. Far too plentiful in S. Australian collections; also on flowers. It is not mentioned in Mr. Masters' Catalogue.

A. australis, Hope. I have taken in various localities, on flowers, an *Anthrenus* which agrees fairly well with the very brief description of this insect. The only discrepancy is that the elytra are (not black but) dark brown, becoming paler towards the apex; one example has *very* dark brown elytra, which might almost be called blackish, and it may perhaps vary to black. It has the three wavy fascia of white pilosity as described. It has abdominal sulci for the reception of the hind legs, and eleven-jointed antennæ with a three-jointed club.

A. ocellifer, sp. nov. Ovalis, lateribus parum rotundatis; confertissime squamis nigris fulvis et albis vestitus, supra squamis fulvis et albis submaculatim dispersis his in illis mediis positis, subtus squamis albis superficiem totam (nisi abdominis latera et apicem fulvo-squamosa) tegentibus; niger, pedibus rufis; crebre sat subtiliter punctulatus; antennis 11-articulatis, clava 3-articulata; pedibus in sulcis receptis. Long., $1\frac{1}{5}$—$1\frac{1}{2}$ l.; lat., $\frac{3}{5}$—$\frac{4}{5}$ l.

The black fulvous and white scales are on the prothorax mixed confusedly; on the elytra they take the form of fulvous spots on a black ground, the middle part of the fulvous spots being white; there are seven or eight spots on each elytron. I do not know any other *Anthrenus* presenting the following characters in combination:—Antennæ eleven-jointed, with a three-jointed club, all the legs received in sulci, antennæ entirely black, legs entirely red, ventral segments without any black spots; body densely scaly.

S. Australia; on flowers.

A. Flindersi, sp. nov. Ovalis; obscure nigro- et griseo-hirtus; niger, antennis totis tibiis tarsisque rufis, elytris apice rufescentibus; crebre sat subtiliter (prothoracis disco minus crebre magis subtiliter) punctulatus; sulcis antennariis valde profundis, fere transversim positis, externe subrotundatis; segmento ventrali basali utrinque transversim sulcato.

Maris (?) antennarum clava 3 articulata, articulis 1-8 conjunctis longitudine æquali, articulis 3-8 perbrevibus (7° et 8° paullo latioribus); clava cylindrica, hujus articulo 2° quam

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ceteri sat minori, articulo apicali apice rotundato-angustato. Long., $1\frac{1}{5}$ l.; lat., $\frac{3}{5}$ l.

Feminæ (? hujus speciei) antennarum articulo apicali quam 9us sat breviori (elytris fasciis albopilosis 2 instructis, altera basali altera antemediana, his secundum suturam conjunctis). Long., $1\frac{4}{5}$ l.; lat., 1 l.

The prosternal sulci of this insect are very deep, run obliquely (or almost transversely) across the front portion of the prosternum, their extremity being on the lateral margin considerably in front of the hind angles of the prosternum, and are rounded at their extremity (as in *A. Musæorum*).

I hesitate to refer the female described above to this species, on account of its very much greater size, the somewhat conspicuous fasciæ on its elytra, and the less clearly testaceous colour of its antennal club. The male example described above is, however, certainly abraded, and may have had the elytral fasciæ when fresh. It may be distinguished from the species I take for *A. australis*, Hope, apart from colour, by the much larger club of its antennæ.

S. Australia; near Port Lincoln, the male on flowers of *Hakea*.

BYRRHIDÆ.

BYRRHUS.

The following species is evidently congeneric with that which I described in Trans. Roy. Soc., XII., p. 138, as *B. Torrensensis*, although the tarsi are still less contractile. I drew attention (loc. cit.) to the feebleness of the tibial channels in that species. In the present insect the tarsi do not appear to be laid back in repose altogether *against* the tibiæ, but to be so placed that their base is in a groove at the apex of the tibiæ, and their apical joints are free. This character is inconsistent with *Byrrhus*.

B. raucus, sp. nov. Subglobosus; nitidus; subfortiter (prothorace crebre, elytris minus crebre) punctulatus; pilis nigris erectis perlongis crebre vestitus; supra æneus subcuprascens, antennis tarsisque rufescentibus; subtus niger, crebre fortiter rugulose punctulatus. Long., $1\frac{2}{5}$ l.; lat., 1 l.

Very like *B. Torrensensis*, but more globose, clothed with longer hair, differently coloured, the prothorax more strongly punctured, the underside black or nearly so, and much more strongly and roughly punctulate.

Victoria; in the Alpine district.

HETEROCERIDÆ.

HETEROCERUS.

H. Victoriæ, sp. nov. Elongato-oblongus; sat nitidus; griseo-pubescens; piceo-niger, prothoracis lateribus elytrorum notis

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numerosis tibiis intus tarsis et mandibulis rufis; prothoracis angulis posterioribus marginatis; elytris creberrime minus subtiliter sat aspere punctulatis, sat perspicue striatis. Long., 2 l.; lat., $\frac{3}{5}$ l.

The markings on the elytra are well defined and intricate; they consist of an irregular red lateral border scarcely reaching the base or apex; from this a branch runs off behind the shoulder towards the suture, which on the middle of the disc turns upward and reaches the base, along which it runs a short distance towards the scutellum, and then turns down again, running somewhat parallel to (and close beside) the suture to about a third the length of the elytron; the red lateral margin gives off another branch behind its middle, which runs obliquely forward almost to the hind extremity of the front branch, and is in the form of two triangles having their apices directed hindward and their bases in a continuous line; between this hind branch and the apex there is an elongate red spot.

This species is extremely like the European *H. marginatus*, Fab. Compared with that insect it is a little narrower and less robust, with prothorax scarcely so strongly punctulate and elytra very evidently striate. The puncturation of the elytra is scarcely different. The prothorax is a little more narrowed both in front and behind, and has more strongly rounded sides, but is scarcely less transverse.

Compared with *H. Flindersi*, Blackb., this insect has much more closely punctulate elytra, while from *H. Australasiæ*, Waterh., and *H. multimaculatus*, Blackb., it differs *inter alia* in not having the elytra perceptibly narrowed behind the shoulders.

Victoria; Alpine district.

H. indistinctus, sp. nov. Elongato-oblongus; minus nitidus; griseo-pubescens; piceo-niger, prothoracis lateribus elytrorum notis numerosis tibiis intus tarsis femoribus et mandibulis pallide testaceis; prothoracis angulis posterioribus marginatis; elytris vix perspicue striatis, crebre sat subtiliter vix aspere punctulatis. Long., 2—$2\frac{1}{5}$ l.; lat., $\frac{7}{10}$—1 l.

This species is undoubtedly very close to the preceding, but I cannot regard it as a mere variety.

The markings on the elytra, from some points of view, are entirely concealed by the pubescence; they are as follows on each elytron:—A marginal band widely continued to both base and apex, which is dilated in a kind of blotch scarcely in front of the middle, and again immediately behind the middle; two elongate spots almost side by side on the disc a little in front of the middle; a spot of variable form (bifid in some examples) on the disc just behind the middle (in some examples this spot is connected with

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the external of the two anterior spots, and in some with the hinder dilatation of the pale margin); an elongate subapical spot.

The present insect differs from *H. Victoriæ* in colour, the lighter parts being pale yellow instead of rufous, and the femora being testaceous instead of blackish, also in its non-striate elytra (in most examples they are non-striate, in some there is a scarcely perceptible indication of striæ) and in the distinctly finer, less rugulose, and less close puncturation of the elytra; the spines on the anterior tibiæ are more numerous, being nine or ten, while in *H. Victoriæ* they number only seven or eight. Compared with *H. Flindersi* the elytra are considerably more closely punctured; and the elytra not (or scarcely) narrowed behind the shoulders will separate it from *H. Australasiæ* and *H. multimaculatus*. In some specimens (probably males) the prothorax is less transverse than in others.

Victoria; on the banks of the river Ovens.

H. Flindersi, Blackb. The puncturation of the elytra in this species is scarcely distinguishable from that in the European *H. femoralis*, Kiesenw.

LAMELLICORNES

ATÆNIUS.

A. speculator, sp. nov. Minus angustus; minus parallelus; minus nitidus; setis erectis pallidis brevissimis vestitus; niger, clypei margine prothoracis margine antico palpis antennis pedibusque rufescentibus; capite subtilius densissime punctulato (puncturis in rugis longitudinalibus confusis), clypeo antice sat fortiter rotundato-emarginato; prothorace crebre ruguloso-punctuato, fortiter transverso, angulis posticis plane rotundatis; elytris striatis, interstitiis convexis obscure asperato-granulatis. Long., 2 l. (vix); lat., $\frac{4}{5}$ l.

Differs from *A. australis*, Har., by its less narrow, less parallel form, its pale setæ, scarcely costiform elytral interstices, prothorax much more narrowed hindward, and with scarcely any trace of a dorsal sulcus, &c., &c. The species described by Sir W. Macleay as *Ammœcii* are stated by the Baron de Harold to be (at least some of them) *Atœnii*. They are from N. Queensland and N. W. Australia. None of them are described as being clothed with pale setæ. *A. granulator*, Har. from New Guinea, appears to be very near the present species, but to be somewhat larger, the clypeus subtruncate, &c.

In this species the humeral spine is small, but very well-marked, and more directed outward than in *A. australis*, Har.

Victorian Alps.

A. Palmerstoni, sp. nov. Minus angustatus; minus parallelus; minus nitidus; ater, pedibus piceis (anticis rufescentibus),

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antennis testaceis; capite subtilius creberrime punctulato, clypeo antice rotundato-emarginato; prothorace fortiter sat crebre subrugulose punctulato, fortiter transverso, lateribus sat parallelis, angulis posticis dentatis; elytris late sulcatis, sulcis intus seriatim granulatis, interstitiis anguste costatis, humeris fortiter spiniformibus. Long., 2½ l.; lat., 1 l.

The hind angles of the prothorax are very peculiar, being strongly dentiform; behind the tooth-like projection the sides run evenly round hindward, so that the hind part of the prothorax is in the form of a distinct wide lobe.

N. Territory of S. Australia.

ANOPLOGNATHUS AUREUS, *Waterh.*

From the "Zoological Record" for 1889, received a few weeks ago, I learn that this species was described in the "Ann. and Mag. of N. Hist." for Oct., 1889. It must be very like (as regards size, colour, &c.) my *Calloodes Frenchi*, described in a paper read before the Linnæan Society of N.S. Wales in March, 1890; but I think the statement in describing *A. aureus* that its elytra have "only one or two lines of punctures at the sides," and that their "margins are not reflexed in the middle," is conclusive as to the two being distinct. As remarked in a previous paper of this series, I cannot regard *Calloodes* as really distinct from *Anoplognathus*, although the name is convenient if it be regarded as that of a subgenus founded on merely superficial characters.

BUPRESTIDÆ.

CHALCOPHORA.

C. Frenchi, sp. nov. Splendide viridis, cyaneo-micans; capite longitudinaliter excavato et in medio carinato (carina antrior sum furcata); prothorace fortiter subcrebre vermiculatm-ruguloso, utrinque basi longitudinaliter impresso, linea dorsali irregulari elevata; elytris costatis fere ut *C. superbœ*, Saund. (sed costa suturali fere recta, submarginali plane ad apicem producta), apice subtruncatis, margine laterali postice denticulato, apice suturali spiniformi; corpore subtus crasse ruguloso; antennis obscure cyaneis, articulis basalibus 2 viridibus. Long., 22 l.; lat., 8 l.

A magnificent species of brilliantly metallic colour, varying from green to cyaneous or purple, according to the light in which it is looked at. It is nearly allied to *superba*, Saund., from which it differs (apart from colour) as follows:—The prothorax is much more closely and evenly vermiculate (almost exactly as in *gigas*, Hope), and has a very distinct longitudinal impression running forward from the base a little nearer to the lateral margin than to the middle on either side (I do not know any other Australian

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species of *Chalcophora* in which this character is so well marked); the elytra are very much less narrowed off at the apex, and their costæ are a little differently arranged, that next the suture being parallel to the suture (in *superba* the same costa is very strongly curved a little before the apex), and that nearest the lateral margin being continued quite to the apex; the costæ, moreover, are subobsolete near the base. On the undersurface the sculpture is very much coarser, the vermiculate smooth elevations occupying a much larger proportion of the area as compared with the depressed closely punctured spaces; the prosternum is concave longitudinally between the coxæ (in *superba* it is convex), and the basal ventral segment (the specimens before me seem to be of the same sex, probably female), is much more narrowly concave down the middle, the apical ventral segment being narrowly sinuate-truncate at the apex (it is not much different in same sex of *superba*, but in the unique example before me is slightly chipped, and therefore I cannot be quite certain). The concavity of the prosternum will, I think, distinguish this species from all its near allies (*i.e.*, *gigas*, Hope, *Waterhousei*, Masters, and *superba*, Saund.); its colour also is completely distinctive, and from *Waterhousei* it may be known by its prothorax and elytra nonpubescent.

N. Queensland; in the collection of C. French, Esq.

STIGMODERA.

S. tibialis, Waterh. Mr. Tepper, of the S. Australian Museum, has lately shown me a very fine series of this insect, which has lately been placed in the Museum by Mr. C. F. Johnson, M.P. They were taken in W. Australia (near York), where, I do not think, there has been any record of the species occurring. *S. tibialis* is evidently extremely variable, as I find the elytra of some specimens entirely yellowish red, of others entirely dark red, and of others dark red, with two or more more or less defined paler fasciæ. In some examples the ventral segments are more or less spotted with yellowish. Among all these varieties I do not find any approximation to *S. Stevensi*, Gehin, in respect of the colouring of the sides of the prothorax, but the acuteness of the angulation on the intermediate tibiæ (which is said to be a distinguishing character) is very variable in degree, and I am afraid an examination of the specimens before me suggests inevitable doubt as to the validity of Mr. Waterhouse's species.

S. princeps, sp. nov. Femina. Sat late oblonga, minus convexa; nigra, vix ænea, prothorace plus minus piceo-rufescenti, elytrorum lateribus (parte antica excepta) anguste (et apice late) sanguineo-marginatis; capite vix concavo, minus fortiter sat crebre (ut *S. parvicollis*) punctulato; prothorace

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trans basin quam longiori vix dimidio (postice quam antice duplo) latiori, crasse confuse (indisco sat sparsim, quam *S. parvicollis* multo minus crebre) punctulato, margine antico bisinuato postico in medio (ut *S. parvicollis*) lobato, lateribus a basi ad medium fere parallelis; elytris (fere ut *S. parvicollis*) valde striatis, interstitiis convexis subtiliter sat sparsim punctulatis, apicibus simplicibus; sternis in medio sparsissime sat fortiter, latera versus sat crebre acervatim (prosterno crassissime rugulose) punctulatis; abdomine nitidissimo fere lævigato, segmentis basali apicalique et ceterorum partibus lateralibus puncturis raris instructis. Long., 20—24 l.; lat., $7\frac{1}{2}$—$8\frac{1}{2}$ l.

The general appearance (in respect of colour and markings) is suggestive of *S. grandis*, Don., but the prothorax is more or less reddish and without a pale margin, the elytral pale margin begins more or less behind the base and is confined in front to the narrow edging outside the outermost stria (the next interstice being included from the middle or thereabouts), and the apex (about the apical one-fifth or one-sixth part of the whole elytra) is sanguineous).

In all other respects this species is extremely close to *S. parvicollis*, Saund., from which it scarcely differs otherwise, except as follows:—It is much larger and distinctly wider, the prothorax is evidently larger in proportion to the other parts (its anterior narrowing commencing evidently further from the base) and is much less closely sculptured; on the undersurface (in the same sex) the sides of the metasternum and the ventral segments are much less closely sculptured.

In all probability, the male differs from the female as in *parvicollis*, having the undersurface much more closely sculptured, and the apical ventral segment much shorter and subtruncate.

W. Australia; taken by J. C. F. Johnson, Esq.

S. rectipennis, sp. nov. Sat angusta, sat parallela; nigra, vix cyanea, elytrorum lateribus anguste (et apice late) sanguineo-marginatis, prothorace (in angulis posticis) et abdomine nonnullis exemplis sanguineo-notatis; capite longitudinaliter late concavo minus fortiter sat crebre (ut præcedentis) punctulato; prothorace trans basin quam longiori dimidio (postice quam antice fere duplo) latiori, confuse sat rugulose sat crebre (disco postice nec crebre rugulose) punctulato, margine antico bisinuato postico in medio late sat fortiter lobato, lateribus a basi fere ad medium subparallelis; elytris post humeros vix sinuatis, valde striatis, interstitiis vix perspicue punctulatis, (6° toto 7° 8° que antice confusis rugulosis), apicibus late leviter emarginatis, biacutis; corpore subtus sat hirsuto, sat fortiter sat crebre subæqualiter

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(prosterno metasterno et in femina segmento 1° basali in medio sparsius subtilius, prosterni lateribus crassius) punctulato.

Maris segmento ventrali apicali late leviter emarginato, feminæ truncato. Long., 15 l.; lat., 5½—6 l.

This species is distinguishable from all others known to me of the genus by the elytra being scarcely sinuate behind the shoulders; in *S. macularia*, Don., the elytral sinuation is slight, but in the present insect it is less marked still. I have seen two males and two females; both the former have the apical ventral segment bright red, and one of them has the penultimate red and the antepenultimate spotted with red, while the other has merely the penultimate spotted with red; of the females one has the hind body entirely black while the other has the apical segment spotted. The female with the hind body entirely black has the prothorax also entirely black, in the other three examples before me at least the hinder part of the lateral margin of the prothorax is red.

W. Australia; taken by J. C. F. Johnson, Esq.

S. imperator, Thoms. There can be no doubt, I think, that this is another name for *S. Murrayi*, Gemm. and Har., which was substituted in 1869 for *S. trifasciata*, Murr., a preoccupied name. Thomson's name was published in 1878, and therefore becomes a synonym.

TENEBRIONIDÆ.

CÆDIOMORPHA.

C. australis, Blackb. In describing this species (Trans. Roy. Soc. S.A., 1887, p. 272) I accidentally omitted to state the size; it is, long., 2 l.; lat., 1⅗ l.

LINDIA.

L. angustata, Blackb. In describing this species (Trans. Roy. Soc. S.A., 1887, p. 275) I accidentally omitted to state the size; it is, long., 2 l.; lat., ½ l.

PLATYDEMA.

P. obscurum, Blackb. (Proc. L.S., N.S.W., 1888, p. 1,430). Mr. G. C. Champion—a well-known English authority on the *Tenebrionidæ*—has kindly drawn my attention to the fact that this was a pre-occupied name; I therefore propose *T. Championi* as a substitute.

PHYTOPHAGA.

Prasonotus morbillosus, Chap. This name having been preoccupied by Mr. Baly, I propose *Chapuisi* as a substitute.

CRYPTOCEPHALUS.

C. consors, Boisd. I have recently seen an example of this

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species sent to me by Mr. Olliffe for inspection, in which the yellow elytral margin is absent. This agrees with Boisduval's description. Suffrian (Mon. XIII., p. 103) seems to think that the yellow margin was accidentally overlooked by Boisduval, and redescribes the insect as having it. In all other respects the example I am referring to seems to agree with specimens having the yellow border.

EDUSA.

This genus was originally formed by M. Chevrolat, and published in M. Dejean's Catalogue (1837), but M. Lefèvre in 1885 proposed to substitute *Edusia*, on the ground that *Edusa* was a nom. præocc, having been used by Albers in 1860 for a genus of *Mollusca*. It is difficult to understand the reason of this proposal, especially as *Edusa* was recognised and in use in the *Coleoptera* before 1860 by others than its author, M. Bohemann, for example, having used it in 1858 for species that M. Lefèvre now calls *Edusia*. The species attributed to the genus differ considerably *inter se* in respect of facies and structure, in consequence of which Dr. Chapuis in 1874 (Gen. Col., vol. X.) proposed to adopt three names—*Edusa*, *Edusina*, and *Edusella*—as marking three subgenera of *Edusa*. I do not think that this subdivision can be maintained, at any rate unless a number of other subgenera be added; I have a large number of species before me, not half of which will fit exactly into any of those Dr. Chapuis characterised. I shall therefore not attempt to apportion any of the new forms among subgenera beyond remarking that the first six evidently would fall into the subgenus *Edusa*, and that *E. œnea* and *minor* might probably fall in *Edusina*. *E. suturalis*, Chap., is the only species I have seen that agrees with the description of *Edusella*. The "Groupe *Edusites*" of Chapuis is characterised among the *Eumolpidæ* by the following in combination:—Prosternal episterna convex in front, elytra transversely wrinkled. In this group, *Edusa* was the only Australian genus known to Dr. Chapuis, and he separated it from those of other countries primarily by its being pubescent. The Rev. H. Clark had, however, characterised two other genera—*Thaumastomerus* and *Ocnus*—from N.W. Australia, but in such terms that Dr. Chapuis could not satisfy himself even as to the "groupe" in which they should be placed; he could see no reason, however, to say that they might not be merely somewhat aberrant species of *Edusa*. It should not be overlooked, nevertheless, that Dr. Baly has since appeared to recognise *Ocnus* as a good genus, having attributed to it a new species from N.W. Australia. I have not seen any *Edusites* from N.W. Australia, or any species that seems to me likely to belong to either of the Rev. H. Clark's genera if they are distinct from *Edusa*. In 1885 M. Lefèvre formed a new genus of

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Edusites under the name *Cleptor*, which, however, does not seem to differ from *Edusa* by any very striking character. Apparently, *Cleptor* has the eyes entire (instead of "obsoletely sinuate within"), the antennæ shorter, with the apex thickened; the body glabrous, the prosternum transverse, the femora unarmed, and the tibiæ longitudinally sulcate; these are all the points of difference I can discover. I have not seen any species in which all of them are to be found, but one or more characterise a good many species which I cannot separate from *Edusa*, and I think they are all discoverable in some or other of the series in my collection. In 1889 I formed a new genus of *Edusites* under the name *Edusoides*, distinguished by its tibiæ being produced laterally at the apex into an elongate horizontal process in both sexes; I have seen no other species presenting any indication of this character.

My conclusion therefore is that I am unable to find any well-marked and constant character (except in the case of *Edusoides*) by which to break up *Edusa* even into subgenera, and I accordingly apply that name to all the Australian *Eumolpidæ* known to me possessing the following characters in combination:—Prosternal episterna convex in front, elytra transversely wrinkled at the sides, tibiæ not externally prolonged at the apex into a horizontal process. The following characters in addition are present in all the species known to me:—Tibiæ not emarginate externally near the apex, anterior femora very rarely altogether simple, the basal joint of at least the anterior tarsi dilated in the male, claws divaricate and appendiculate, the sexes differing *inter se* in the structure of the basal ventral segment. I may add that I think a better anatomist than myself might probably discover generic differences that I have not observed.

The following is a tabulation of the new species described below, together with such others of the *Edusæ* as I have identified. I do not think that I have seen any of the species from N.W. Australia which the Rev. H. Clark described, and the absence from his descriptions of reference to structural characters renders it impracticable to place those species (without having seen them) in a tabulation. A similar remark would apply to the species described by Germar and Bohemann as having the anterior femora unarmed; I have not seen any of these three, and the descriptions do not state whether the femora are angulate or rounded beneath. There remain unknown to me besides the above *E. puberula*, Bohem., from Sydney (which seems to be near my *E. bella*, but to have the clypeus entirely testaceous, and the antennæ shorter), and *E. viridicollis*, Lef. (which appears to be a large species with dense pubescence, and the posterior tibiæ of the male incurved at the apex, characters I have not seen in combination).

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It should perhaps be added that the antennæ are usually slender filiform, and not very much shorter than the body. As they appear to vary a little in length sexually, I have not found them very useful for specific characters, and have not made special mention of them in my descriptions, except in a few cases where their structure is exceptional.

A. Upper surface more or less pubescent or setiferous.
  B. The elytral vestiture consists of setæ or fascicles of setæ about the sides and apex.
    C. Front angles of prothorax (at least fairly) well defined.
      D. The elytral setæ forming fascicles.
        E. The femora testaceous.
          F. The prothorax very closely and roughly punctulate ... varipes, Boisd.
          FF. The prothorax not closely or roughly punctulate distincta, Blackb.
        EE. The femora entirely blackish spinicollis, Blackb.
      DD. The elytral setæ not forming fascicles.
        E. The prothorax not very closely punctured nor much wrinkled transversely.
          F. The scutellum punctured and scarcely nitid.
            G. Hind tibiæ of male strongly incurved at the apex ... varians, Blackb.
            GG. Hind tibiæ of male simple minor, Blackb.
          FF. Scutellum nitid lævigate ... Froggatti, Blackb.
        EE. Prothorax very closely punctured and much wrinkled transversely ... ... chrysura, Germ.
    CC. Front angles of prothorax quite rounded off ... ... diversicollis, Black.
  BB. The elytral vestiture evenly distributed, and in general much finer.
    C. Upper surface more or less metallic.
      D. Anterior femora simply rounded beneath ... ... inermis, Blackb.
      DD. Anterior femora widely angulate, but not with a distinct tooth.
        E. Elytra set with erect hairs ... pavens, Blackb.
        EE. Elytra with adpressed pubescence only ... ... Meyricki, Blackb.
      DDD. Anterior femora with a well-defined tooth.

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E. Elytra with well-defined vittæ of whitish pubescence; prothorax and elytra unicolourous otherwise.
F. Femora testaceous ... ... lineata, Blackb.
FF. Femora blackish ... ... ænea, Blackb.
EE. Species not marked and coloured as "E."
F. Hind femora rounded beneath.
G. Elytra set with longish erect hairs.
H. Prothorax nearly twice as wide as long ... pilifera, Blackb.
HH. Prothorax much less than twice as wide as long ... ... fraterna, Blackb.
GG. Elytra devoid of longish erect hairs.
H. Upper surface entirely green.
I. Puncturation extremely fine, and not asperate ... ... glauca, Blackb.
II. Puncturation much stronger and asperate bella, Blackb.
HH. Upper surface not entirely green.
I. Tooth on anterior femora exceptionally small.
J. Elytra with well-defined lines of whitish pubescence perplexa, Blackb.
JJ. Elytra uniformly pubescent ... suaveola, Germ.
II. Tooth on anterior femora normally large ... ... læta, Blackb.
FF. Hind femora dentate ... hirta, Blackb.
CC. Upper surface not metallic ... suturalis, Chap.
AA. Upper surface glabrous.
B. Prothorax dentate laterally ... ... singularis, Blackb.
BB. Prothorax unarmed ... ... glabra, Blackb.

E. chrysura, Germ. Minus brevis; nitida; sparsim pilosa, pilis in elytris haud fasciculatis; supra læte metallica, colore

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variabilis; antennarum articulis 1-4 testaceis (1° supra viridi excepto), 5° 6° que ad apicem infuscatis, 7-11 (nonnullis exemplis 7° ad basin excepto) piceis; corpore subtus æneo vel nigro, griseo-pubescenti; femoribus æneis; tibiis testaceis, harum apice tarsisque infuscatis; palpis basi testaceis apice piceis; prothorace quam longiori multo latiori, antice minus angustato crebre rugosule punctulato et transversim fortiter strigato, lateribus regulariter rotundatis, basi bisinuata, margine antico bisinuato in medio sat producto, angulis obtusis, posticis certo adspecto subdentatis, scutello crebre nec profunde punctulato; elytris quam prothorax quarta parte latioribus, fere ut prothorax sculpturatis sed etiam magis fortiter transversim rugatis; prosterno et mesosterno inter coxas valde (et inter se æqualiter) latis.

Mas. Tarsorum anticorum et intermediorum articulo basali fortiter dilatato subovali; abdomine pilis erectis sat longis insigni, segmento 1° ventrali in medio planato-elevato, parte planata glabra subtilissime transversim strigata; tibiarum posticarum parte tertia apicali deformi introrsum valde incurva, spina apicali nulla. Long., $3\frac{3}{4}$—4 l.; lat., $1\frac{3}{4}$—2 l.

The prothorax is about three-fifths again as wide as long.

S. Australia; common.

E. varians, sp. nov. Subelongata; nitida; sparsim pilosa, pilis in elytris haud fasciculatis; supra læte metallica, colore fere ut *E. chrysuræ* sed tibiis ad apicem vix picescentibus; prothorace fere ut *E. chrysuræ* sed minus fortiter transverso, multo minus crebre nec rugosule punctulato, haud distincte transversim rugato; scutello punctulato; elytris fere ut *E. chrysuræ;* prosterno et mesosterno inter coxas minus latis.

Mas. Tarsis fere ut *E. chrysuræ* sed anticorum articulo basali breviori; abdomine pilis longis erectis insigni, segmento ventrali basali in medio planato transversim subtilissime strigato haud elevato; tibiis posticis ad apicem fortiter abrupte incurvis, ad apicem exteriorem spina armatis. Long., $3\frac{1}{8}$ l.; lat., $1\frac{3}{4}$ l.

The prothorax is scarcely more than half again as wide as long.

S. Australia; common near Port Lincoln.

E. diversicollis, sp. nov. Elongata; nitida; sparsim pilosa, pilis in elytris haud fasciculatis; supra læte metallica, colore fere ut *E. chrysuræ;* prothorace quam longiori vix dimidio latiori, subtiliter sat sparsim punctulato, lateribus valde rotundatis, margine antico antrorsum fortiter æqaliter convexo, nullo modo (basi vix) bisinuato, angulis vix manifestis;

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scutello vix punctulato; elytris quam prothorax tertiâ parte latioribus, fere ut *E. chrysuræ* sculpturatis sed paullo minus crasse; prosterno et mesosterno inter coxas minus latis.

Mas. latet. Long., $3\frac{1}{2}$ l.; lat., $1\frac{3}{5}$ l.

Very distinct by the front margin of the prothorax being absolutely without sinuation, even at its outer extremities. In the absence of the male I cannot be certain that this species should be placed in this section.

Australia; I do not know the exact habitat of this species.

E. Froggatti, sp. nov. Minus elongata; nitida; sparsim pilosa, pilis in elytris haud fasciculatis; supra læte metallica, colore fere ut *E. chrysuræ* sed tibiis apice vix infuscatis et antennarum articulis omnibus (basin versus utique) testaceis vel piceo-testaceis; prothorace quam longiori circiter dimidio latiori, fortiter minus crebre punctulato, lateribus sat fortiter rotundatis, margine antico ad latera sinuato in medio antrorsum late fortiter convexo, basi bisinuato, angulis anticis distinctis posticis certo adspectu dentatis; scutello haud punctulato elytris fere ut *E. chrysuræ* (sed manifeste—præsertim postice—minus crasse) sculpturatis; prosterno et mesosterno inter coxas sat latis; femoribus posticis vix dentatis.

Mas. latet. Long., $3\frac{1}{5}$ l.; lat., $1\frac{3}{5}$ l.

The lævigate nitid scutellum furnishes a very distinctive character.

N.S. Wales; taken by Mr. Froggatt in the Blue Mountains.

E. spinicollis, sp. nov. Ovalis; nitida; sparsim pilosa, pilis in elytris fasciculatis; supra læte metallica; colore ut *E. chrysuræ;* prothorace quam longiori dimidio latiori, antice leviter angustato, crebre rugosule punctulato et transversim sat fortiter strigato, lateribus regulariter rotundatis, basi margineque antico bisinuatis, angulis anticis spiniformibus posticis obtusis; scutello sat fortiter punctulato; elytris fere ut prothorax sculpturatis sed magis fortiter transversim rugatis; prosterno et mesosterno inter coxas valde latis.

Mas. Tarsorum anticorum et intermediorum articulo basali modice dilatato; abdomine haud pilis erectis vestito, segmento basali in medio elevato planato, parte planata subtilissime transversim strigata; tibiis posticis apice minus fortiter incurvis. Long., $3\frac{1}{5}$ l.; lat., $1\frac{3}{5}$ l.

Extremely like the species which I take to be *E. varipes*, Boisd.; indeed, I regard it as possibly an extreme Alpine form of that insect, which differs from the present one by its entirely testaceous antennæ, and its legs also testaceous, except the infus-

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cate apex of the tarsi, as well as by its prothorax very evidently wider at the base as compared with the width of the base of the elytra. *E. varipes* (?) moreover is nearly always of an obscure brassy colour above, whereas all the examples I have seen of the present species are bright blue or green, or coppery red. I may add that the description of *E. varipes* is so defective that it is little more than a guess to attribute any insect to it. The brassy colour and fasciculated elytral pilosity are the only distinctive characters mentioned, and the colour of the legs and antennæ, the size, and the sexual characters are all omitted. *E. varipes* (?) is found in N.S. Wales.

Victoria; in the Alpine district.

E. distincta, sp. nov. Modice elongata; nitida; sparsim pilosa, pilis in elytris fasciculatis; supra læte metallica; colore ut *E. chrysuræ* sed pedibus (tarsis apicem versus exceptis) antennisque (articulis 1° supra ceterisque ad apicem summum, exceptis) testaceis; prothorace quam longiori fere duplo latiori, antice leviter angustato, fortius minus crebre punctulato, lateribus leviter arcuatis, basi valde (margine antico leviter) bisinuata, angulis omnibus distinctis vix acutis; scutello punctulato; elytris crebre fortiter punctulatis et fortiter transversim rugatis (fere ut *E. chrysuræ*).

Mas. Latet.

Much like *E. varians*, but distinguished *inter alia* by its flavescent femora, very strongly transverse prothorax, and much more roughly punctured elytra.

Victoria; Alpine district.

E. minor, sp. nov. Modice elongata; nitida; sparsim pilosa, pilis in elytris haud fasciculatis; supra læte metallica, colore fere ut *E. chrysuræ* sed tibiis apice vix infuscatis; prothorace quam longiori paullo plus tertia parte latiori, cetera ut *E. Froggatti*; scutello obscure punctulato; elytris fere ut *E. chrysuræ* sed postice minus fortiter sculpturatis; prosterno et mesosterno inter coxas sat latis; femoribus posticis vix dentatis.

Mas. Fere ut *E. chrysuræ*, sed segmento basali ventrali in medio haud elevato, tibiis posticis apice haud intus curvatis

Femina latet. Long., $2\frac{4}{5}$ l.; lat., $1\frac{2}{5}$ l.

Very like *E. Froggatti*, but considerably smaller, with the prothorax less transverse, and the front part of the elytra very much more roughly sculptured; the sexual characters of the male also are probably different.

S. Australia.

E. ænea, sp. nov. Ovalis; sat parallela; pube grisea vestita, hac in elytris circiter 6-seriatim longitudinaliter disposita;

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obscure ænea, labro antennis femorum tibiarumque basi rufis, antennarum articulis apice piceis, clypeo antice scutelloque viridibus; capite prothoraceque opacis coriaceis obsolete punctulatis; hoc quam longiori plus dimidio latiori, antice parum angustato subtruncato, lateribus leviter arcuatis, basi vix bisinuata, angulis obtusis; scutello crebre aspere punctulato; elytris subnitidis, vix substriatis, basin lateraque versus subrugosule punctulatis et obscure transversim rugatis alibi crebre subtiliter nec rugosule punctulatis.

Mas. Tarsorum anteriorum 4 articulo basali fortiter dilatato; tibiis posticis apice abrupte breviter incurvis; segmento ventrali basali in medio planato glabro nitido fere impunctulato. Long., $2\frac{1}{5}$ l.; lat., 1 l.

Victoria; Alpine district.

E. perplexa, sp. nov. Ovalis, subparallela; pilis fulvis vestita, his in elytris lineis crebris dispositis; capite prothorace scutelloque opacis coriaceis vix manifeste punctulatis læte viridibus; elytris obscure aureo-olivaceis, labro palpis antennis (harum articulis plus minus nigro-terminatis) pedibusque testaceis; prothorace quam longiori dimidio latiori, antrorsum vix angustato, antice posticeque bisinuato, lateribus modice rotundatis, angulis obtusis; scutello punctulato; elytris utrinque juxta scutellum subgibbosis, leviter subtilius sat crebre punctulatis, antice et latera versus transversim rugatis, et ibi magis crasse punctulatis; femoribus anticis dente parvo armatis, posticis muticis.

Mas. Tarsorum anteriorum 4 articulo basali sat dilatato; tibiis posticis apice manifeste nec fortiter incurvis; abdomine setis longis erectis vestito, segmento basali in medio planato pernitido lævigato. Long., 2 l.; lat., 1 l.

This species appears to be intermediate between Dr. Chapuis' sub-genera *Edusina* and *Edusella*, the posterior tibiæ in the male having their apex very briefly but quite distinctly bent inwards, the process, however, being so short that it might easily be passed over without notice. The tooth on the front femora is scarcely larger than in *E. suaveola*, Germ.

Victoria; sent to me by C. French, Esq.

E. lineata, sp. nov. Ovalis; sat parallela; pube grisea vestita, hac in elytris circiter 8-seriatim longitudinaliter læte dispositis; obscure ænea, labro antennis pedibusque (tarsis obscurioribus) læte testaceis; cetera ut *E. ænea*.

Mas. Fere ut *E. ænea*, sed tibiis posticis apice nullo modo incurvis. Long., $2\frac{1}{5}$ l.; lat., 1 l.

This species is remarkably like the preceding. It scarcely differs from it, except in the colouring—the legs (except the

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tarsi) being clear testaceous, and the elytra much more conspicuously striped with pale grey—and in the hind tibiæ of the male being straight. I have seen eight specimens of this species (of both sexes), and two males of the former, and the differences seem quite constant. I do not think that they can be regarded otherwise than as two good species. Dr. Chapuis' arrangement of *Edusa* would place them in distinct sub-genera.

I have before me two female examples scarcely differing from this species except in being of a bright rosy colour with legs entirely testaceous and having the basal part of the elytra more distinctly rugulose. In the absence of the male, I am at a loss to determine whether they represent a distinct species.

Victoria; Alpine district.

E. lata, sp. nov. Ovalis; pilis griseis æqualiter sat dense vestita; capite prothoraceque opacis coriaceis obsolete sparsim punctulatis, illo (scutelloque) læte viridibus, hoc aureo-brunneo certo adspectu viridi-micanti; elytris sat nitidis aureo-brunneis subcupreo-micantibus, corpore subtus viridi, abdomine aureo-micanti, labro antennis palpis pedibusque læte testaceis; prothorace quam longiori vix dimidio latiori, in medio longitudinaliter obsolete carinato, antrorsum parum angustato, antice bisinuato in medio sat producto, lateribus leviter arcuatis, basi leviter bisinuata, angulis obtusis; scutello punctulato; elytris leviter subtilius sat crebre punctulatis subhumeris vix transversim rugatis, puncturis basin versus et ad latera crassioribus; femoribus anticis dente magno armatis, posticis muticis.

Mas. Tarsorum anteriorum 4 articulo basali modice dilatato; tibiis posticis apice haud incurvis abdomine in medio setis longis erectis vestito, segmento basali in medio planato pernitido fere lævigato. Long., $2\frac{1}{5}$ l. (vix); lat., 1 l.

This species bears much resemblance to *E. suaveola*, Germ., from which, however, it may be at once distinguished by the much larger tooth of the anterior femora.

Victoria; Alpine district.

E. bella, spec. nov. Ovalis; sat parallela; pube aurea subtili æqualiter sat dense vestita; supra omnino læte prasina subtus viridis, abdomine aureo-micanti; labro palpis antennis pedibusque testaceis; capite prothoraceque opacis coriaceis obsolete sparsim punctulatis; prothorace fere ut *E. lætæ* sed haud carinato, antice in medio parum producto; scutello punctulato; elytris femoribusque fere ut *E. lætæ*, sed femorum anticorum dente minori.

Mas. Tarsorum anteriorum 4 articulo basali modice dilatato; tibiis posticis apice haud incurvis; abdomine in medio setis

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longis erectis vestito, segmento basali in medio vix planato. Long., $1\frac{4}{5}$ l.; lat., 1 l. (vix).

This species (of which I have both sexes) might almost pass for a small differently coloured form of *E. læta*, but on careful examination I am convinced that it is really distinct, the prothorax having its front margin evidently less produced in the middle, and being quite devoid of the faint carina which runs down the middle in the latter; the basal ventral segment in the male, moreover, is much less lævigate.

Victoria; Alpine district.

E. glauca, sp. nov. Sat breviter ovalis; sat nitida; pube supra aurea subtus grisea sat dense vestita; supra sat pallide viridis vix aureo micans, subtus magis ænea, labro palpis antennis pedibusque testaceis; capite prothoraceque subcoriaceis leviter minus crebre punctulatis; hoc quam longiori dimidio latiori, antrorsum vix angustato, antice fortiter bisinuato in medio late fortiter producto, lateribus fere rectis, basi bisinuata, angulis obtusis; scutello punctulato; elytris crebre subtiliter punctulatis, latera versus paullo magis fortiter punctulatis et vix transversim rugatis; femoribus anticis dente mediocri armatis, posticis muticis.

Mas. Tarsorum anteriorum 4 articulo basali parum dilatato; tibiis posticis apice haud incurvis; abdomine in medio setis paucis longis erectis vestito, segmento basali in medio planato nitido fere lævigato. Long., $1\frac{4}{5}$—2 l.; lat., 1—$1\frac{1}{5}$ l (vix).

Of a paler, more "dead" green colour than *E. bella*, otherwise closely resembling it in colour, but at once distinguishable by much finer puncturation of the elytra and the much more distinct puncturation of the prothorax. The tooth on the anterior femora is very evidently larger than in *E. suaveola*, Germ.

S. Australia; not uncommon on flowers near Port Lincoln.

E. pilifera, sp. nov. Breviter ovalis; sat nitida; pilis griseis brevibus æqualiter sat dense vestita, nonnullis in elytris intermixtis multo longioribus erectis nigricantibus; rosea-metallica, subtus obscure ænea, labro antennis palpis pedibusque rufo-testaceis; capite prothoraceque distincte leviter sat sparsim punctulatis, hoc quam longiori fere duplo latiori, antrorsum vix angustato, antice fere truncato, basi rotundata, lateribus leviter arcuatis, angulis obtusis; scutello punctulato; elytris leviter minus subtiliter sat crebre punctulatis, sus humeris sat fortiter transversim rugatis et ibi crasse fortiter punctulatis; femoribus anticis dente parvo armatis, posticis muticis.

Mas latet. Long., $1\frac{4}{5}$ l.; lat., 1 l.

A very distinct species, much shorter and wider than any of

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the preceding, and with coarser puncturation; the erect long hairs on its elytra are also a good character. The tooth on the anterior femora is not much larger than in *E. suaveola*, Germ.

Victoria; Alpine district.

E. fraterna, sp. nov. Ovalis; sat nitida; pilis albidis et nonnullis elongatis erectis fulvis, confuse vestita; obscure ænea, labro palpis antennis (harum articulo basali supra et ultimis ad apicem obscurioribus) femorum basi tibiisque testaceis; capite prothoraceque crebre sat fortiter punctulatis; hoc quam longiori vix dimidio latiori, antrorsum parum angustato, antice in medio late sat fortiter producto, lateribus sat fortiter rotundatis, basi vix bisinuata, angulis rotundato-obtusis; scutello punctulato; elytris sat fortiter rugosule punctulatis, apicem versus substriatis, pone humeros fortiter transversim rugatis; femoribus anticis dente sat magno armatis, posticis muticis.

Mas. Tarsorum anticorum articulo basali modice (intermediorum vix manifeste) dilatato; tibiis posticis apice haud incurvis; segmento 1° ventrali in medio pernitido lævigato. Long., 2 l.; lat., 1 l.

Resembles *E. perplexa* in colour and build, but *inter alia* is very much more coarsely punctured, and the hind tibiæ of the male are not at all incurved at the apex.

Victoria; Alpine district.

E. hirta, sp. nov. Breviter ovalis; sat nitida; densissime æqualiter griseo-pubescens; supra roseo-cuprea, subtus ænea, clypeo viridi, labro palpis antennis pedibusque (horum, nonnullis exemplis, femoribus tibiisque apice plus minus infuscatis) testaceis; capite prothoraceque subcoriaceis obsolete punctulatis; hoc quam longiori fere duplo latiori, antrorsum parum angustato, antice profunde bisinuato, in medio late fortiter producto, lateribus leviter arcuatis, basi leviter bicinuata, angulis anticis productis sat acutis, posticis obtusis; scutello punctulato; elytris substriatis, crebre minus fortiter (latera versus magis fortiter) punctulatis, sub humeros obscure transversim rugatis; femoribus anticis dente sat magno, posticis sat parvo, armatis.

Mas. Tarsorum anticorum articulo basali sat fortiter (intermediorum vix manifeste) dilatato; tibiis posticis apice haud incurvis; segmento 1° ventrali in medio paullo minus crebre punctulato. Long., $1\frac{1}{2}$—2 l.; lat., $\frac{4}{6}$—1 l.

The dense grey pubescence under which the sculpture and colouring is buried will distinguish this species from all known to me of its congeners.

S. Australia; Yorke's Peninsula.

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E. pavens, sp. nov. Sat breviter ovalis; sat nitida; pilis griseis brevibus æqualiter sat dense vestita, nonnullis intermixtis longioribus erectis nigricantibus; ænea, labro palpis antennis pedibusque testaceis; capite prothoraceque sat subtiliter sat crebre punctulatis; hoc quam longiori circiter dimidio latiori, antrorsum haud angustato, antice in medio late valde producto, basi manifeste bisinuata, lateribus subdeplanatis fortiter rotundatis, angulis anticis fere rotundatis posticis obtusis; scutello punctulato; elytris subfortiter punctulatis et transversim rugatis; femoribus anticis late angulatis vix dentatis, posticis muticis; antennis minus elongatis apicem versus subincrassatis.

Mas. Latet. Long., 1½ l.; lat., ⅘ l. (vix).

This little species resembles *E. fraterna* in the stiffish erect bristles with which it is clothed, and also resembles *E. Meyricki* (vide infra) in general appearance and its antennal structure, but differs widely from both *inter alia* in the shape of its prothorax, and from the latter in its much coarser sculpture.

W. Australia; taken by E. Meyrick, Esq.

E. Meyricki, sp. nov. Sat breviter ovalis; sat nitida; sat æqualiter sat dense griseo-pubescens; ænea subcuprascens, labro palpis antennis (articulo 1° supra et ultimis apicem versus exceptis) pedibusque testaceis; capite prothoraceque subcoriaceis et leviter sat sparsim punctulatis; hoc quam longiori dimidio latiori, antrorsum sat angustato, antice leviter bisinuato in medio late sat fortiter producto, lateribus modice rotundatis, basi leviter bisinuata, angulis anticis fere acutis posticis rectis; scutello punctulato; elytris leviter vix crebre (latera versus paullo crassius et hic obscure transversim rugatis) punctulatis, femoribus anticis late angulatis vix dentatis, posticis muticis; antennis minus elongatis apicem versus subincrassatis.

Mas. Tarsorum anteriorum 4 articulo basali fortiter dilatato; tibiis posticis apice haud incurvis; segmento ventrali basali in medio subplanato sublævi. Long., 1⅘ l.; lat., 1 l.

The whitish grey pubescence on the elytra is here and there condensed into a somewhat conspicuous patch or tuft, but it is possible that this may be due to the rest of the surface being a little abraded in my unique example. The antennæ shorter than usual in the genus, and having the apical joints a little incrassated furnish a very noticeable character.

W. Australia; taken by E. Meyrick, Esq.

E. inermis, sp. nov. Ovalis; nitida; pube aureo-fulva sat æqualiter sat dense vestita; viridi-metallica, labro palpis antennis pedibusque testaceis; capite prothoraceque fortius

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minus crebre punctulatis; hoc quam longiori circiter dimidio latiori, antrorsum vix angustato, margine antico vix sinuato antrorsum producto, basi vix bisinuata, lateribus sat fortiter rotundatis, angulis anticis fere rectis posticis obtusis; scutello punctulato; elytris sat fortiter sat crebre punctulatis, antice latera versus subcrasse rugatis; femoribus muticis; antennis quam corpus sat brevioribus.

Maris tarsorum anteriorum 4 articulo basali modice dilatato; tibiis posticis apice haud incurvis; abdomine setis longis erectis vestito; segmento basali in medio subplanato pernitido sublævi obscure transversim rugato. Long., $1\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l.

The sculpture of the elytra is much like that of *E. pavens*, but the prothorax is much more strongly and less closely punctulate. This species also probably resembles *E. evanescens*, Boh., but the latter appears to be a considerably smaller insect still, with the clypeus yellow, the head opaque, and the antennæ as long as the body.

S. Australia; a single example in the S. Australian Museum,

E. glabra, sp. nov. Breviter ovalis, lata; glabra; colore variabilis, viridis vel purpurea, labro palpis antennis pedibusque (horum trochanteribus nigris) testaceis; capite prothoraceque subtiliter (hoc ad latera, fortius) minus crebre punctulatis; hoc quam longiori fere duplo latiori, antrorsum angustato, antice fortiter bisinuato, basi fortiter bisinuata, lateribus leviter arcuatis, angulis anticis acutis posticis obtusis; scutello vix punctulato; elytris sat fortiter subseriatim (seriebus subgeminatis) punctulatis, apicem versus substriatis, vix transversim rugatis; femoribus anticis dente parvo armatis, posticis muticis; tibiis extus obscure longitudinaliter canaliculatis; antennis quam corporis dimidium sat longioribus.

Mas. Tarsorum anteriorum 4 articulo basali fortiter dilato; tibiis posticis haud apice incurvis; abdomine (exempli masculi unici) fracto. Long., $1\frac{1}{2}$—$1\frac{4}{5}$ l.; lat., $\frac{4}{5}$—$1\frac{1}{5}$ l. (vix).

This species presents several of the distinctive characters attributed to *Cleptor*, but its dentate anterior femora and antennæ —quite two-thirds the length of the whole body—forbid its being placed in that genus.

E. singularis, sp. nov. Ovalis; nitida; glabra; colore variabilis (ænea vel violacea vel cuprea), antennarum palporumque basi pedibusque rufo-brunneis; capite fortiter confuse vix crebre punctulato; prothorace quam longiori fere duplo latiori, antrorsum sat angustato, antice bisinuato in medio late sat fortiter producto, crasse rugulose minus crebre

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punctulato, lateribus fortiter rotundatis tridentatis, basi bisinuata, angulis anticis spiniformibus posticis breviter dentatis; scutello lævi; elytris fortiter punctulatis, postice striatis minus fortiter punctulatis, latera versus transversim valde rugatis; femoribus anticis dente parvo armatis, posticis muticis; tibiis extus canaliculatis.

Mas. Tarsorum anteriorum 4 articulo basali valde dilatato; tibiis posticis haud apice incurvis; abdomine setis longis erectis vestito, segmento basali in medio planato, penultimo in medio lævigato pernitido, ultimo fossa profunda instructo. Long., 3 l.; lat., $1\frac{1}{3}$ l.

A remarkable insect, with no near ally among described species; it might perhaps be regarded as the type of a new genus. In some of its characters it agrees with *Cleptor*.

Victoria; Alpine district.

COCCINELLIDÆ.

ORCUS.

O. cœlestris, sp. nov. Sat fortiter convexus; sat nitidus; supra cœruleus, viridi violaceoque micans; subtus niger—antennis, tarsis, tibiis anticis et abdomine testaceis; capite sparsim subtiliter, prothorace subtiliter minus sparsim, elytris sat crebre subfortiter, punctulatis. Long., $1\frac{4}{5}$ l.; lat., $1\frac{3}{5}$ l. (vix).

A very pretty species, resembling in colour *O. cyanocephalus*, Muls., and *chalybeus*, Boisd., but scarcely so convex as either of those insects, and much more strongly and closely punctured than either of them, or than *O. Australasiæ*, Boisd. From *O. cyanocephalus* it differs also in the colour of the legs, and from *O. chalybeus* in the more strongly rounded sides of the prothorax. *O. Lafertei*, Muls., I have not seen, but it appears to be a larger insect, of somewhat similar colour, but having some conspicuous violet spots symmetrically arranged on the prothorax.

N. Territory of S. Australia.

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Description of a New Genus and Species of Marsupialia, "*Notoryctes typhlops*."*

By E. C. Stirling, M.A., M.D

Lecturer on Physiology in the University of Adelaide, Hon. Director of the South Australian Museum.

[Read February 3, 1891].

The first specimen of this animal, received by the South Australian Museum, was forwarded by the courtesy of Mr. A. Molineux, Secretary of the Agricultural Bureau. Wrapped merely in a rag saturated with kerosine and enclosed in a revolver-cartridge box, it had travelled over a thousand miles largely by packhorse and coach. Consequently it was in a very bad condition on arrival in Adelaide. On this specimen, which appeared to be a female, were based some preliminary notes communicated to the Royal Society of South Australia on the 4th September, 1888, and an almost similar communication was made to the correspondence columns of '*Nature*' shortly afterwards. Some few months subsequently I received three more specimens, all males, of which one only was in anything like good preservation. The reasons for the delay in the publication of the present description, which is based upon an examination of the four specimens then to hand, and for the new name under which it now appears, are explained in a concluding paragraph. By the kindness of His Excellency the Governor, Lord Kintore, I have recently had the opportunity of making, with him, the complete transit from North to South of the Australian Continent. Though the opportunity of traversing the zoologically unexplored regions of Central Australia would, under any circumstances, have proved an attractive programme, a special inducement for the journey was afforded by the fact that our route must pass through the tract of country in which the animal had been found, and hence arose the possibility of my being able to secure additional specimens. In this expectation I have happily been successful, for, I was fortunate enough to secure six complete examples, and one skeleton. Amongst these are four females, which sex had been represented only by the first specimen. This, however, was so much decomposed as to leave some doubt of its character. On my return from the transcontinental journey, I found the present

* The name "Psammoryctes," originally selected for this new genus, having been already appropriated, that here employed is substituted.

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paper in the printer's hands, and it will be submitted practically as I left it. Nevertheless, I am now in a position to offer some interesting particulars of its habits, which were obtained on my journey, and also to verify the important fact of the existence of a well-marked pouch in the female, on which point I could not at first be absolutely certain from the bad condition of the soft parts in the first specimen received. Unfortunately, an accidental circumstance together with certain political exigencies made it necessary that His Excellency's journey should be made with greater rapidity than could be wished from my point of view, and it thus became impossible for me to reach the exact locality where the specimens had been found; but I passed within fifty miles of the spot, and through country which is of a precisely similar character. Further, I had the advantage of meeting on our journey the man who himself captured the first specimen sent down, and by the kind consideration of the manager of the Idracowra Station, their book-keeper, Mr. J. F. Bishop, was instructed to wait for me at a stated locality through which our track must pass. To Mr. Bishop's zealous efforts I owe the whole of the last lot of specimens, as well as much valuable information concerning their habits and habitat. As may be imagined, it was with feelings of much satisfaction that, on reaching our camp one evening at the Horse-shoe Bend of the Finke River, I met Mr. Bishop with his welcome complement of specimens safe in his saddle-bags. From Mr. C. Benham also, who had previously been employed on the same run, and by whom the first specimen was forwarded to the Museum, I have also received much valuable information concerning the animal. Both Mr. Bishop and Mr. Benham have seen the animals alive, in a state of nature as well as in captivity, and the following notes comprise all the information that I could acquire from these two principal sources, as well as from some natives of the locality whom I questioned on the matter.

HABITS AND HABITAT.

It appears that the first specimen was captured by Mr. Wm. Coulthard, manager of the Frew River Station and other Northern runs belonging to the Willowie Pastoral Company. Attracted by some peculiar tracks, on reaching his camp one evening on the Finke River, while traversing the Idracowra Station with cattle, he followed them up and found the animal lying under a tussock of spinifex or porcupine grass *(Triodia irritans)*. Though he is an old bush hand, with all the watchful alertness and powers of observation usually acquired by those who live lives of difficulty and danger, this was the first and only specimen of the animal he ever saw. As previously stated, this found its way to the Museum through the agency of Messrs. Benham and

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Molineux. The three subsequently received shortly afterwards, as well as the last lot recently secured by Mr. Bishop during our journey through the country, were also found on the Idracowra Station. This is a large cattle-run comprising several hundred square miles of country in the southern part of the Northern Territory of South Australia, which lies immediately to the West of the telegraph line between the Charlotte Waters and Alice Springs Stations. The great dry watercourse of the Finke River, which runs from N.W. to S.E., bounds the run for some eighty miles on the North and North East. Its distance from Adelaide is roughly speaking a thousand miles. Flats and sandhills of red sand, more or less well covered with spinifex and acacias, constitute a large portion of the country, and the rainfall is inconsiderable. Curiously enough, all the specimens hitherto received by me have been found within a circumscribed area, four miles from the Idracowra Head Station, which is situated on the Finke watercourse itself, and almost invariably amongst the sandhills. I have it, however, on very fair authority, that the animal has been seen on the Undoolya Station, which lies immediately South of the McDonnell Ranges, and that one also was found drowned after heavy rain at Tempe Downs, a station situated about 120 miles W.S.W. of Alice Springs. These points will sufficiently define its range, so far as is known at present. They do not appear to be very numerous. Very few of the white men in the district had ever seen it, even though constantly travelling, and not many of the natives whom I came across recognised the well-executed coloured drawing I carried with me. It must be remembered, however, that I did not pass through the exact spot which so far appears to be its focus of distribution. Nor did a very considerable reward, which I offered, cause any specimens to be forthcoming between the first lot received, over two years ago, and that recently secured during my transcontinental trip. With few exceptions the animals have been captured by the aboriginals, who, with their phenomenal powers of tracking, follow up their traces until they are caught. For this reason they can only be found with certainty after rain, which sets the surface of the sand and enables it to retain tracks that would immediately be obliterated when it is dry and loose. Nor are they found except during warm weather. So that the short period of semi-tropical summer rains appears to be the favourable period for their capture. For this suitable combination of wet and warmth, Mr. Bishop had to wait three months before he was able to get them, and in all cases they were found during the day time. Perpetual burrowing seems to be the characteristic feature of its life. Both Mr. Bishop and Mr. Benham, who have seen the animal in its native state, report that

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emerging from the sand it travels on the surface for a few feet, at a slowish pace, with a peculiar sinuous motion, the belly much flattened against the ground while it rests on the outsides of its fore-paws, which are thus doubled in under it. It leaves behind it a peculiar sinuous triple track, the outer impressions, more or less interrupted, being caused by the feet, and the central continuous line by the tail, which seems to be pressed down in the rear. Constantly on the look-out for its tracks, I was often deceived by those of numerous lizards, which are somewhat similar in these respects. It enters the sand obliquely and travels underground either for a few feet or for many yards, not apparently reaching a depth of more than two or three inches, for whilst underground its progress can often be detected by a slight cracking or moving of the surface over its position. In penetrating the soil free use, as a borer, is made of the conical snout with its horny protecting shield, and the powerful scoop-like fore-claws are also early brought into play. As it disappears from sight, the hind limbs, as well, are used to throw the sand backwards, which falls in again behind it as it goes, so that no permanent tunnel is left to mark its course. Again emerging, at some distance, it travels for a few feet upon the surface and then descends as before. I could hear nothing of its making, or occupying at any time, permanent burrows. Both my informants lay great stress on the phenomenal rapidity with which it can burrow, as observed both in a state of nature and in captivity. In some notes sent me by Mr. Benham the following statement appears:—"Almost any of the men here (Idracowra) can tell you how one got away from me in the loose sand. I brought it home alive, and began talking about how fast it could burrow, so Mr. Stokes wanted to see it. We took a spade and loosened the top soil near the house, and put it down; I kept my hand close to it until it was nearly out of sight, and then started scratching after it, but it was too quick; so I took a shovel and began to dig after it, but could not get him. One of the men then came with another shovel, and also a lubra (aboriginal female) who scratched, but the three of us failed to get him." Making all allowances for possible misdirected energies in this experiment, there is no doubt but that their burrowing powers are remarkable. Mr. Bishop, who knew of my approach, made great efforts to keep alive for me some of those he had captured, and placed them for safe keeping in buckets of sand, but in spite of all care and attention one only lived as long as four days. Night and day the sound of their ceaseless burrowing was to be heard. Acting on my advice, previously given, in consequence of an examination of the contents of the intestines of one of the earlier specimens, he supplied them with

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ants as food, but they ate none. They did, however, eat one "witchety," the native name of large white grubs, much relished by the blacks as an article of food, which are the larval forms of certain Longicorn beetles and Lepidoptera, and Mr. Benham informed me that one of his ate a piece of bread on one occasion, but it only lived a day. They thus appear to stand captivity extremely badly. On being handled they make no attempt to bite. No blackfellow that I questioned had ever seen the young, nor did they know anything whatever of any nests or breeding places used by them. Their native name is "oor-quámata," the terminal "*r*" of the first syllable being much rolled so as almost to convey the sound of an interpolated short "*i*" between the "*r*" and the "*q*"; the accentuated syllable is strongly marked, the vowels having the same value as in "quarrel." Mr. Benham stated that the natives have a superstitious dread of them, and applied to one the term "kudoicka," which they translate as "devil-devil"; but I could not get this confirmed by any of the blacks I saw. In fact the natives seem to know very little about them and could give me no information whatever as to what their food was or whether they got it under or above ground. With the material at my disposal I should be able definitely to settle this point, and indeed, in one of my first specimens, I did most certainly find the remains of ants and some other insect debris in what remained of the intestines; but as the Editor of these Transactions urgently calls for the completion of this paper, I am reluctantly obliged to postpone to a future issue the result of further investigation on this and other points.

GENERAL DESCRIPTION.*

(Pl. II., III., and IV.)

The fur, in the three specimens (all males) in which it was sufficiently well preserved for accurate description, may be described as being generally of a light fawn colour, long, soft and of a bright lustrous and silken appearance. In parts it deepens to a glistening golden hue, and in others it inclines more to a silvery aspect. In the last specimen received, which was in a much better state of preservation than any of its predecessors, the fur was considerably lighter than in the others, and the silvery tint more pronounced. The colours of all these have faded considerably

* It will be remembered that the following description is based upon an examination of the first four specimens received in 1888 and 1889. One only of these had been satisfactorily preserved in spirit; all the others were merely wrapped in rag saturated with kerosine and enclosed in small tin boxes. I have, however, incorporated some additional information, having reference to the pouch in the female.

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since they have been kept in spirit, but plates II. and III. which were made soon after their receipt, give a fair idea of the original colour.* In two, the fawn changed to a darker and somewhat rusty tint round the root of the tail, both on the upper and under surface; but this was scarcely marked in the lighter coloured specimens. Two also showed a distinctly darker coloured patch on the back over the region of the pelvis.

The shoulder, being brought forwards close up to the skull, leaves no appearance externally of a neck, and the head together with the front portion of the trunk, gradually widening from the snout backwards to the shoulders, form a sort of blunt-ended cone, which is flattened somewhat on its under surface and directed downwards. This, with a curiously similar ventral flexion of the posterior part of the trunk and tail, gives the whole body a characteristically arched appearance, so that when placed on a flat surface the snout, hands, feet, and tail are almost in the same plane.

The dorsal surface of the nose is covered with a hard horny shield, marked by a transverse ridge which divides it into an upper (posterior) and a lower (anterior) segment. The front margin of this shield bounds the external nares and is prolonged downwards on on each side of these apertures; it forms also the anterior border of the septum narium which is continuous with a horny plate of a similar texture, though less hard and horny, corresponding to the upper lip. The fur extends right up to the margins of the whole of this horny area; but immediately adjacent to its sides, and especially margining the upper lip, it is shorter, coarser, stiffer and of a lighter colour, approximating to the character of whiskers. This has been a trifle exaggerated in pl. II., fig. 2, and insufficiently expressed in fig. 1.

The nostrils looking downwards and forwards are wider in the transverse than in the vertical direction, and are rendered very irregular in outline from the encroachment of two processes from the surrounding horny shield—one from the upper the other from the outer margin.

The mouth, ventral in position, has, when viewed from that aspect, a contour represented by two sides of a slightly obtuse-angled triangle. The extreme point of the chin is destitute of hair, but on its under surface and margining the under lip there are the same short stiff hairs as on the upper lip. The tongue, fleshy, broad at the base and tapering to a blunt point, is somewhat similar in shape to the human tongue, but relatively longer and narrower.

No eyes are visible externally, and the smallest opening

* Plate III. does this more accurately than Plate II., in which latter the colour is represented as too uniformly golden, as well as a shade too dark.

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through the skin corresponding to their position cannot be detected. The ear-openings are distinct, two mm. in diameter, though almost completely concealed by the fur which grows right up to their margins. The aperture is surrounded by a ring-like fold of the integument, which very slightly raises its margin above the level of the surrounding skin, and in the interior of the meatus are thickly-set vibrissæ. Its position is 15 mm. behind and above the angle of the mouth, measured along a line which would continue the normal direction of the mouth-slit backwards.

The tail is peculiar. Hard, tough, leathery in texture and appearance for the greater part, it is marked with conspicuous annular ridges to the point. Thick at its insertion, it tapers to a blunt or even knob-like tip. On the dorsal surface, the soft fur of the body extends over it for about half its length, but the ventral and lateral surfaces are bare nearly to the anus. At about its middle there are two lateral projections or tuberosities, which give increased width to the tail in that position, causing it to be there even wider than at the point of its insertion. This is particularly marked in one specimen, but in all, indications of the same peculiarity exist. The vent is margined by a ring of very long, straight hairs.

The limbs (Pl. II., III., IV.) are short and strong, the fur extending down to the manus and pes respectively. The fore-limb terminates in a manus of most peculiar construction, the structure of which is so distorted that it can hardly be understood without previous reference to its osteology, and in the absence of this I fell into error as to the order of the digits in my first description. It is so folded, that when seen in the position assumed by the preserved specimen, the two large conspicuous claws of the third and fourth digits conceal all the other parts from view, except the blunt and broad horny nail of the fifth, which is seen projecting at the posterior part of the base of the fourth. On the inner side of these, and separated from them by a deep cleft, which opens inferiorly and posteriorly, is a tough, leathery and much wrinkled palm, from which emerge the slender claw-like nails of the pollex and second digit. Thus, owing to this folding of the hand, the digits may be described as consisting of two rows with a cleft between them; the outer comprising the third, fourth, and fifth, and the inner the first and second. The wrinkled and baggy palm, corresponding to the latter two, covers them on their outer surface as far as the roots of the claws; posteriorly it overlaps them, and extends upwards to the base of the short nail of the fifth digit. On the dorsal surface of the hand, which faces inwards, the outlines of the first and second digits are evident, and the fur, here thin and sparse, extends only to the metacarpal region. The claws of these two are long, slender, narrow

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and tapering, that of the first being the more so. The claws of the third and fourth are very large and strong, the former being 15 mm. x 4 mm., of uniform width and ending bluntly; the fourth, shorter but much wider at the base and triangular in shape, tapers rapidly to a point. The fifth is represented externally by a broad and stumpy nail.

The hind limbs (Pl. II., III., IV.) are also short and strong, and have the plantar surface of the pes turned almost directly outwards, so that its fifth digit lies in front. This surface is much wrinkled into several large baggy folds directed obliquely across the sole, and is covered with a leathery skin like that of the palm, which extends as far as the base of the nails, and even encroaches on their plantar surface. The claws of the hallux, second, third and fourth digit are concave on their plantar surface, and those of the third and fourth are curved both outwards and backwards. The fifth is represented by a strong and short stumpy nail, rather like that of the corresponding digit in the manus, and lies more towards the palmar surface than the others. The length of the fourth is six mm., and the others diminish in length towards the hallux. On the dorsal (inward) surface the course of the first four digits can be seen through the integument, and the skin covering them is free from hair as far upwards as the base of the metacarpals.

OSTEOLOGY.

THE SKULL.

(Pl. VI., fig. 1; Pl. VII., figs. 1 and 2.)

The outline of the skull, including the zygomata, is conical, with the occipital region expanded and well developed; anteriorly it tapers to the region of the exterior nares which are terminal, and, owing to the overhanging nasal bones, these orifices open downwards and forwards and have a quadrangular outline. The occipital plane is flat and almost vertical. Within the zygomatic arches the skull is constricted about the mid-region of the orbito-temporal fossæ, widening again considerably in the region of the juncture of the lachrymal and superior maxilla on each side. The vertex is smooth, without any median ridge and considerably flattened, and the bones throughout are exceedingly thin, papery and translucent.

The occipital foramen is almost circular, but slightly compressed laterally by the encroachment of the condyles. These also are compressed laterally and have their long axes running parallel and almost truly antero-posteriorly. From behind forwards (or from above downwards) their contour is almost semicircular, and their articular surfaces look backwards for their upper, and downwards

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for their lower half. A line drawn touching the most posterior parts of both condyles lies almost exactly in the occipital plane.

No indication of a separate interparietal exists, nor can the outline between the occipital and parietal bones be distinguished; but at the juncture of the occipital plane with the vertex, and defining the limits of the former area, a well-marked almost semicircular occipital ridge occurs, which disappears at the level of the posterior (or upper) margin of the occipital condyles. From the occipital tubercle a slight vertical ridge runs downwards almost meeting the occipital foramen. On the vertex of the skull, a ridge for muscular attachment runs forwards and outwards, and then downwards from the occipital tubercle, till it becomes continuous with the upper edge of the zygoma. Close behind, and parallel to this ridge, are two smaller ridges which become merged into that just described at a point before it reaches the zygoma. (Pl. VI. and VII., fig. 1.) As between the occipital and parietal bones, no delimitation between the parietals and squamosals, or between the parietals and frontal, can be distinguished.

In front of the skull, the sutures can be distinguished, and the shape and extent of the nasals, superior maxillæ, premaxillæ and part of the lachrymals are as shown in fig. 1, Pl. VI. and VII. In the position of the opening of the lachrymal canal is a well marked circular depression, due to thinning of the bone; but I am unable to detect any patent orifice. The infraorbital foramen is large and transmits a very large nerve. The malar cannot be made out as a separate bone, but, springing from the malar region, opposite the penultimate molar tooth, proceeds a well marked zygomatic arch, so much compressed laterally throughout that it forms a thin vertical lamina, very narrow in front, but gradually widening as it proceeds backwards, until, in its posterior half, it becomes relatively very wide; a portion of its hinder end enters into the formation of the articular surface for the lower jaw, and forms a marked preglenoid prominence. The junction of the arch with the squamosal is close to the cranial part of the latter, so that very little of the arch itself is formed by the latter bone. The length of the arch is to that of the whole skull almost exactly as 1 to 3.

Behind, the glenoid surface is formed chiefly by the squamosal, which projects externally in the form of a reversely placed C-shaped ridge, the lower limb of the ridge running forwards and downwards and bounding the upper and front part of the auditory meatus, then, losing itself in the tympanic part of the auditory bulla, which latter projects forward under the glenoid cavity.

The auditory bulla (Pl. VI., fig. 1; and Pl. VII., fig. 2) is large and conspicuous, but has throughout exceedingly thin and fragile

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walls. It extends so far backwards that it abuts against the anterior half of the occipital condyles, and reaches forwards to a point corresponding to about the middle of the zygomatic arch. Its anterior third is formed by the alisphenoid, the middle third by the tympanic, and, into the formation of the remainder, both the mastoid portion of the periotic and of the exoccipital appear to enter, but the latter cannot be, with certainty, defined from the other elements of the occipital bone.

In the anterior part of the orbito-temporal fossa, the lateral parts of the frontal and the lachrymal project outwards and somewhat backwards, forming a prominence, instead of a hollow, in the orbital region, which has exceedingly thin walls. Behind this prominence, and corresponding to about the junction of the anterior and middle third of the orbito-temporal fossa, the skull is constricted by a shallow groove passing downwards and backwards, corresponding to that which usually marks out the division between the orbital and temporal parts of the fossa. Behind this groove the cranium bulges a little, and is then again constricted by a similar groove, which runs downwards and a little forwards, nearly meeting the other above the sphenoidal fissure. (Pl. VI., and VII., fig. 1.) Behind this again, the skull broadens very rapidly towards the posterior root of the zygoma, at which point it is widest. Posteriorly the contours converge till they meet the lateral edge of the occipital plane. Sutures between the bones on the side of the skull, other than those mentioned, cannot with certainty be distinguished.

In a view of the inferior surface of the skull, almost the whole extent of the foramen magnum is seen, which thus faces very much downwards. Anteriorly, the basioccipital is completely ankylosed with the basisphenoid, though the junction is well defined by a transverse ridge. There are no paroccipital processes, and the exoccipitals have been described as forming part of the auditory bullæ.

Besides the basisphenoid, parts of the presphenoid, pterygoids and palate bones enter into the formation of the roof of the mesopterygoid fossa, which is wide anteriorly, but much narrowed behind. Its lateral walls are thin and lamelliform, curving inwards at their inferior edges, and the pterygoids end in well-marked, slender and backwardly-projecting hamular processes.

The contour line of the hard palate, including the alveolar borders, gives a markedly pyriform outline, being very wide opposite the middle of the molar series of teeth and tapering anteriorly. The bony palate has a straight posterior border, and its surface is arched transversely; at its junction with the lateral surfaces of the face a sharp edge-like alveolar border is formed, which abuts on the outer borders of the teeth. The junction between

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the palatal and maxillary elements cannot be distinguished, and that between the maxilla and the premaxilla only indistinctly so. Two small and slit-like posterior palatine foramina can be made out in the wet skull (spirit) which transmit small nerves, but they are not distinguishable in the dry. The anterior palatine foramina are large and elongated. Besides these there are, in the hard palate, other smaller foramina irregularly placed, as well as several small circular or oval areas where the bone is much thinned. The posterior nares are compressed in a vertical direction.

With regard to the foramina of the base of the skull, the small size of the parts and the impossibility of distinguishing the sutures make it a little difficult to be sure of their position. The condylar and posterior lacerated foramina can, however, be distinguished in the usual situation, and the large canal for the carotid artery pierces the basiphenoid and passes almost directly upwards. The foramen ovale, foramen rotundum and sphenoidal fissure are all distinct, the latter two being approximately of the same size and both larger than the first. I could detect no separate aperture corresponding to the optic foramen.

A view of the inside of the cranium, through the foramen magnum, shows a relatively large and smooth-walled cavity, of a shape conformable to the external contour of the skull—the bones of the vault being so thin that, with the aid of a hand lens, small type can be distinctly read through them. The floor of the cranial cavity, more or less flat, though rough at its hinder part, rises in front of the basisphenoid region into a well-marked eminence, which slopes away on either side. Anterior to this again, the floor is flat. The auditory bulla seems to project internally, and shows itself as a thin-walled hollow eminence lying in front of what appears to be the petrous element of the periotic, but as I have wished to preserve the specimens intact, I cannot be certain of its exact relations, or of other details of the skull which are not accessible to examination without sections.

In the mandible the rami are relatively wide, and widest in the molar region, narrowing somewhat in front and behind. The front part of the inferior border slopes gradually upwards towards the symphysis, at which the two halves are firmly ankylosed. At about the width of a molar tooth behind the last of the series, the upper border of the jaw rises almost vertically into a strong triangular coronoid process, which has an anterior surface in the form of a laterally compressed isosceles triangle, having for its base the width of the rather wide alveolar border. This surface is vertically grooved, and posteriorly to it, the process is suddenly narrowed to a flat

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plate. The condyloid process, long and sloping very much backward, barely rises to the level of the coronoid, and its articular facet, slightly compressed antero-posteriorly, stands very little above the level of the teeth. The posterior border, in its lower half, becomes expanded, and curls forward so as to form a well-marked masseteric fossa. The angle is continued into a conspicuous, considerably incurved angular process, wide and strong at its origin, but rapidly tapering to a styliform extremity. There is a large inferior dental foramen at the point of intersection of the long axes of the coronoid and angular processes, also a wide and very shallow mylo-hyoid groove. The dental foramen corresponds to the space between the last premolar and first molar.

DENTITION.

(Pl. VI. and fig. 2, Pl. VII.)

Some variation seems to exist in the number of the teeth, more particularly in the premolar region of the lower jaw. The following description is that of a specimen in which they appeared most complete, but it is not the same as that figured in the plate, where one tooth, described in the text, is absent from the lower jaw, as will be pointed out in the proper place, but, in all other essential particulars, the description will apply to any of the specimens.

Maxilla.—Within the premaxillary boundary there are three simple conical or peg-like teeth, the anterior being the largest in all measurements, and having its axis inclined inwards towards its fellow of the opposite side, while the hinder two are nearly vertical. In one dry skull, evidently that of an old specimen, there is a distinct "mark" in all three; in another and younger skull the cutting surface of the most anterior is marked by a groove. Between these incisors there is an interval nearly equal to the width of a tooth of the series.

Just behind the premaxillary suture there is a small tooth similar to, but rather smaller than, the hindermost incisor, the apex of which is inclined a little forward. This, from its position, must be a canine; its apex, also, shows a mark in the old skull. Behind this are two teeth differing considerably in size, but of a similar type, which is quite different from those that succeed them. These two, I take to be the premolars. The anterior and smaller, with its characteristics less well shown, has the anterior part of its crown elevated into a small but distinct cusp, from which the contour of the crown slopes upwards and backwards to its posterior border, where there is a very slight indication of a posterior cusp; the surface of the crown between the cusps is slightly concave. The succeeding tooth is about twice the length and breadth of that just described. It is compressed

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laterally*, and has very distinct anterior and posterior cusps, the former being much the more prominent. There is an almost semi-circular valley between the two, from which a wearing surface slopes upwards on the inner and hinder face. In the closed jaw this comes in contact with the outer surface of the first molar of the mandibular set.

Four molars follow, and one description will suffice for the three anterior, which resemble one another almost exactly in size and shape; the hindermost is smaller and less complex.

Taking the first member of the series, which is that shown in Pl. VI., figs. 3—6, it is compressed antero-posteriorly and mostly so in its mid region, so that the length of the long axis of the crown, which is about twice that of the greatest width, lies exactly athwart the alveolar border. As seen externally (fig. 4), the prominent feature is a pointed, inverted triangular cusp *(a)*, of which the apex corresponds to the centre of the crown when viewed in plan. From the apex of this cusp a concavo-convex surface, showing signs of wear, trends upwards and outwards to the angles at the base, where there are two small but distinct anterior and posterior external cusps *(b* and *c)*. Between these cusps is a groove, which extends vertically to the alveolar edge. The internal face of this prominent apical cusp passes vertically upwards as a smooth rounded border to nearly the level of the palate, then spreads out internally into a concave, subtriangular, overhanging surface also showing signs of wear (figs. 5 and 6, *d)*. The concavity of this overhanging surface being due to the fact that it is bordered by a well-marked rim, which descends internally into an internal cusp *(e)*; from the apex of this, the internal contour passes upwards to the level of the palate (fig. 5, *p)* as a smooth border rounded from below upwards, and still more sharply so, from before backwards. The whole of this part of the tooth has somewhat the shape of the upper bill of a parrot, if it were much blunted and made to have a rounded end instead of a sharp point, or a better simile, perhaps, would be the peak of a military helmet. The horizontal level of this beak-shaped internal cusp is about that of the edge of the alveolar border, though, from the transversely archlike trending of the palate away from this border it stands as much below this surface as it is above the median pointed cusp.

* From the fact that this tooth is placed just where the narrow part of the pyriform area, marked out by the alveolar border, suddenly broadens into the wider end, the outer face of this tooth looks forward as well as outwards. Instead, therefore, of speaking of it as laterally compressed, it would be more correct to say that the axis of compression runs from a point outside and in front to within and behind; or, in other words, the long axis of the crown if continued forwards would strike the canine of the opposite side. *(Vide* Pl. VII., fig. 2.)

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Between the molars, the interval is about that of the antero-posterior width of a member of the series, and is about the same as exists between the front molar and last premolar. The hindermost molar, smaller and simpler than the others, is also compressed antero-posteriorly; still, it shows rudiments of the details just described, the suppression of parts being most marked in the beak-shaped internal cusp, which is here only feebly represented by a ridge with a narrow worn surface.

Mandible.—There are two peg-like incisors of nearly equal size sloping forwards and showing a "mark." The apex of the next tooth, when the jaws are closed, passes just in front of the upper canine, and belongs presumably, therefore, to the same category (fig. 11, *c*). Behind this come three teeth, which I take to be premolars. (Pl. VI., figs. 1 and 11). The most anterior, which is not shown in the figures being absent in the specimen from which they were drawn, is about the size of the canine, but has its front border elevated into a rudimentary cusp, and a wearing surface sloping inwards. Then follows a minute styliform tooth, scarcely as thick as the shaft of an ordinary sewing needle, and about half the length of that just described. This is represented in fig. 11 immediately succeeding the canine (*c*). The hindermost premolar is a more developed type of the first, and much larger. Its anterior border is raised into a pointed cusp, from which a wearing surface slopes backwards and inwards, and bears it at its hinder extremity a small posterior cusp. A small wearing surface, also, shows on the outer face of the tooth.

The four true molars which follow resemble one another, but diminish in size from before backwards; a horizontal section is approximately triangular, with the base inwards (figs. 7—10). The external border, corresponding to the apex, rises into a sharp pyramidal cusp (*a*), and so also do the borders corresponding to the angles at the base (*b*, *c*), only they are less elevated and more rounded. Between these three cusps is a concave worn surface. An interval equal to half the width of a tooth of the series separates the teeth of this order; but from the obliquity with which the teeth are set in the alveoli these spaces are not seen when the jaw is viewed at right angles to its long axis, the outer and hinder border of one tooth overlapping the space intervening between this and the one behind.

The hindermost tooth of all is the fourth maxillary molar, the external cusp of the last mandibular molar passing between the fourth and the third of the maxillary series, the penultimate mandibular molar between the third and second, and so on The external cusps of the lower molars play up and down in the intervals between the large pointed cusps of the upper series, and the concave triangular surface between the three cusps of the lower

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molars can be brought to play upon the under concave surface of the beak-shaped internal cusp of the upper molars, the whole thus representing a very complicated cutting and grinding apparatus. In front of the molars the arch of the mandibular teeth lies within that of the maxillary.

According to the above description, then, the dental formula is

$$i\,\tfrac{3}{2}\quad c\,\tfrac{1}{1}\quad p\,\tfrac{3}{3}\quad m\,\tfrac{4}{4} = \tfrac{10}{10},$$

but as there are certain variations in the skulls at my disposal, and in ignorance of the succession of the teeth, it is possible that this formula may require some modification.

THE HYOID BONE.

(Pl. VII., figs. 3 and 4.)

In one specimen this bone is represented by two flattened rod-like thyrohyals, osseous for the greater part, but cartilaginous at their laryngeal extremities. In front they touch in the middle line, but are not ankylosed. They are joined by a flat, semicircular and cartilaginous basihyal. In another specimen, in which the thyroid had become largely calcified, the thyrohyals were stouter and shorter in front; these were completely ankylosed, and joined by a semicircular basihyal, as in the other case.

THE VERTEBRAL COLUMN.

Atlas (Pl. VII., fig. 5, *a*) free; neural canal almost circular; transverse and spinous processes rudimentary. The articular surfaces for the occipital condyles, concave in the dorso-ventral axis, encroach somewhat on the ventral arch, which is furnished with a semilunar facet for the odontoid process of the axis. The posterior arch bears on its hinder surface a small facet for a corresponding surface on the fused spinous processes of the five ankylosed vertebræ which follow. The rudimentary transverse process carries on its posterior surface a triangular facet for a corresponding surface of the axis.

The five succeeding vertebræ are completely ankylosed, the only indication of the component vertebræ being the intervertebral foramina for the spinal nerves, of which there are four. (Pl. VII., figs. 5 and 6 *c*.) The fused bodies form a bony mass, generally much compressed dorso-ventrally, but having its lateral borders carried considerably downwards and backwards so as to convert the under surface of the mass into a wide shallow groove; in the anterior part of this groove there is a slight median ridge. The neural arches are also ankylosed, but their fused laminæ form laterally compressed plates, pointing forwards, which are much shorter in an antero-posterior direction than the fused bodies. So also are the spinous processes completely fused into a single tuberculated

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prominence, which carries on its anterior surface a facet for the above-mentioned facet on the posterior arch of the atlas. The anterior border of the fused bodies is prolonged into a well-marked triangular, dorso-ventrally compressed odontoid process, of which nearly the whole of the inferior surface is marked with an articulating surface for the atlas. This anterior border carries, also, relatively large triangular or pyriform articular facets for the atlas, which extend nearly up to the base of the odontoid process.

The transverse processes of the ankylosed vertebræ are represented by a minute but distinct conical projection (omitted in fig. 5), which corresponds, in position, with the fifth and sixth, or fourth, fifth and sixth vertebræ, but it apparently contains, also, the fused representatives of all five. From this, a slender bony bar passes to a point about the middle of the lateral edge of the fused bodies, thus forming a sort of vertebrarterial canal. Posteriorly the fused mass presents a broad shallow U-shaped articular surface, which, in its central part, articulates with the body of the next vertebra, and by the lateral parts with the first rib.

The seventh vertebra (Pl. VII., figs. 5, 6 and 8) has a dorso-ventrally compressed body, which articulates with the bodies of the vertebræ in front and behind. Its neural arch is slender and ring-like, without any spinous process. The transverse process is well marked, and bears anterior articulating surfaces on the dorsal surface of its root, which face upwards. The posterior zygapophyses have their articular surfaces looking downwards.

In the eighth vertebra (Pl. VII., figs. 6 and 8) the body is similarly compressed dorso-ventrally. The spinous process is very long, and both it and the laminæ of the neural arch slope much backwards, so that a wide gap is left between this and the neural arch of the preceding vertebra, which inclines forwards. The transverse process, not so prominent as in the seventh vertebra, carries at its root an anterior articular surface which looks upwards. On its under surface, looking forwards and a little outwards, and extending inwards, so as to be continuous with the posterior articular surface of the body, is a surface for articulation with the first rib. Posterior zygapophyses, rudimentary, with their articular surfaces lying almost entirely on the internal surfaces of the root of the laminæ and, from the obliquity of these, facing much downwards as well as inwards. At the posterior part of the lateral border of the body, and continuous with its posterior articular surface, is a facet which, with a corresponding facet on the body of the next vertebra, constitutes the articulation for the head of the second rib.

Reckoning the vertebra, just described, as the first of the

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thoracic series, fourteen follow which bear ribs; these bear a general resemblance to the eighth, with the following modifications.

There is a gradual diminution in length of the spinous processes, and those of the tenth to the thirteenth are the most backwardly inclined; up to this latter point they are slender and rod-like, or rather bayonet-shaped, but at about the fifteenth they begin to be compressed laterally, as well as to become shorter, wider and more vertical. The spinous process of the last thoracic is nearly as wide as high.

Their transverse processes are of uniform length till the eighteenth is reached, then they become progressively shorter, till at the twenty-second, the process is represented only by a ridge. That of the eighteenth is the last, to which a rib is fairly articulated, though in the case of the rib-bearing vertebræ which follow, there are ligamentous bands which attach the neck of the rib to the transverse process. Two contiguous vertebræ provide the articular surface for the heads of all the ribs, except the first, which has a more extensive articulation that will be particularly described, and the last two or three. Each vertebra supplies an equal area in the case of the second and third rib, but, in passing backwards, the articulating surface gradually trespasses more and more on the hindermost of the two contiguous vertebræ till, in the last two or three, it is furnished by the body of a single bone.

In the twenty-first or penultimate thoracic vertebra, the posterior zygapophysis becomes more distinctly marked, and the posterior articular surface is on it, rather than on the inside of the laminæ, as in the case of the vertebræ preceding, from the eighth to the twentieth. This surface is also more markedly convex instead of nearly flat, and looks downwards and outwards, instead of nearly directly inwards; the pair fit into two very concave depressions on the anterior zygapophyses of the last thoracic, which almost meet in the middle line. A similar description applies to the last of the thoracic series.

Metapophyses are distinct on the penultimate thoracic, and become still more marked on the last. Insignificant rudiments of paired hypopophyses, also, appear on the posterior part of the body of the last one of the series.

Four lumbar vertebræ follow (Pl. VII., fig. 9) having the general type of the last thoracic. Transverse processes, small on the first, become larger in the remainder; in the last two they are long, point forward, and have their extremities somewhat hooked ventrally. They spring from the junction of the neural arch with the bodies. The metapophyses, which made their appearance in the hindermost thoracic, become here increasingly developed in

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serial line. The second lumbar carries a pair of ridge-like hypopophyses, but these are quite rudimentary on the vertebræ both in front and behind; and are not distinguishable on the fourth.

Reckoning as sacral vertebræ all that are ankylosed, these are six in number. The fusion is complete, but the number of the constituent vertebræ is revealed by transverse ridges on their ventral surface at the junctions of the bodies, as also by the foramina of exit of the spinal nerves.

The sacrum.—Pl. IX., figs 1—4. The conspicuous feature of the sacrum is an enormous development and fusion of the metapophyses of the constituent vertebræ, which, thus expanded and fused, form a roof, which overhangs the pelvis (figs. 1, 2 and 4 *mm*). This is widest anteriorly, where also it can be seen to be serially continuous with the metapophyses of the lumbar vertebræ; it then narrows slightly, and posteriorly, it widens into two diverging processes (fig. 2). With the under surfaces of the anterior and posterior extremities of this overhanging metapophysial roof are fused the ilia and ischia respectively.

The spinous processes (fig. 2 *s*) are also ankylosed, forming, in front, a keel-like ridge, but behind, the superior edge of this ridge expands laterally into a wide lamina, which, extending outwards, meets, or nearly meets, the fused metapophyses and thus forms either a completely closed canal, or, in the parts where the two elements have not completely met, a deep groove. Into this canal or groove, as the case may be, open large foramina for the posterior divisions of the spinal nerves. The transverse process of the first of the sacral vertebræ is like that of the last lumbar, but stouter and points rather more downwards. The remainder of these elements are fused into an arched lamina (fig. 1 *tr*) which is ankylosed with the ilium in front and the ischium behind. This lamina is perforated by large foramina for the inferior divisions of the spinal nerves.

The first sacral vertebra bears anterior zygapophyses with concave facets for articulation with the posterior zygapophyses of the last lumbar, and similarly, there are small zygapophysial processes with facets for the first of the caudal series (fig. 3 *pz*.).

The Tail.—The caudal vertebræ are twelve in number, the tenth and eleventh being nothing more than rounded nodules, and the last a plano-convex plate (Pl. V., figs. 1 and 2).

The bodies, of the first four or five, are rather elongated; the spinous process broad and distinct on the first two or three, subsequently diminishes in size to the fifth or sixth of the series, where it disappears as a distinct median process, and is afterwards represented by a minute tubercle on each side of the mid-line.

The transverse processes are flat and rather broad in the first

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two, then narrow, but become longer in the next two. So far, they project horizontally, but the transverse process of the fifth points considerably downwards, and has its extremity tuberculated and hooked downwards and inwards, so that it almost meets the chevron bones. The same general features prevail in the sixth, and, in the subsequent caudal vertebræ, where the process exists, it becomes gradually shorter, and terminates in a rough tuberous knob.

There are hypopophyses fused with the bodies of the second and third caudal vertebræ; and, abutting on the junction between the third and fourth is a distinct and separate chevron bone, which is perforated by a canal. These exist at each subsequent vertebral junction, being very largely developed about the middle of the caudal series, and their largely expanded ventral surfaces are rough from the presence of grooves and ridges running in the direction of the long axis of the body. The chevron bones exist quite to the end of the tail, but, corresponding to the last three or four inter-vertebral spaces, they are little more than rounded nodules.

THE RIBS.

Pl. V., figs. 1 and 2. Pl. VII., figs. 5, 6, and 8.

There are fifteen ribs, of which seven are articulated to the sternum.

The first is a remarkable bone. (Pl. VII., figs. 5, 6 and 8). Very short and strong, it forms a powerful buttress for the sternum; it is very irregular in shape, being in general terms expanded at each extremity and constricted in the middle, the constriction being due to a deep notch on the anterior border; or, the rib might be described as being very abruptly bent on itself in such a way that the sternal end points both forwards and inwards. Its large, expanded and irregularly trihedral head is directly articulated with the posterior surface of the laterally-expanded and ventrally-projecting mass of the fused cervical group, which, at this point, represents the sixth. It is also articulated with the transverse process of the eighth, of which the articulating surface encroaches slightly on the body. There is also ligamentous connection with the body and transverse process of the seventh vertebra, the rib thus being very firmly fixed to a wide extent of attachment. The sternal extremity, bent forwards and inwards, as above mentioned, is flattened and very wide, and joins the lateral edge of the presternum, along its whole length, to its junction with the first segment of the mesosternum. (Pl. VII., figs. 5 and 6.) Sometimes there is complete ankylosis at this articulation, the position of the junction being shown by a bony ridge, and in one specimen, complete ankylosis has taken place on one side only.

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The fourteen ribs which follow are all slender and rod-like. Besides the first, the sternal attachment of which has been described, six other ribs join the sternum by means of sternal ribs, which meet the points of junction of the segments of the mesosternum, the union of the second rib being at the meeting of the first and second segment, and so on.

The costal cartilage of each succeeding rib, does not directly meet the sternum, but joins that of its predecessor.

The sternal ribs, in the case of the fourth, fifth, sixth and seventh, are not completely ossified in their outer segments; thus, there intervenes between the end of the vertebral rib and the ossified part of the sternal rib adjacent to the sternum, an intermediate cartilaginous segment. (Pl. VII., fig. 5 *xxxx*). These cartilaginous parts of the sternal ribs are not, however, completely segmented off from the inner ossified parts; the failure in ossification is gradual, and the ossification, complete in the sternal extremity, becomes less and less complete in the outer segment, till eventually cartilage only stands in place of bone. The junction between the cartilaginous segment of the sternal rib and the vertebral rib is quite abrupt.

The heads of the ribs, other than that of the first, are articulated with the bodies of the vertebræ, as mentioned in the description of the spinal column; thus the head of the second rib abuts on the bodies of the eighth and ninth vertebræ, and so on. Following the first, the part in the other ribs corresponding to the tubercle is attached to the transverse processes by ligamentous union, which is close and intricate as far as the eleventh; in the remainder, the union is less close, as the transverse processes gradually diminish in prominence. As already described, the transverse process of the eighth vertebra is distinctly facetted for part of the articulation of the head of the first rib; that of the ninth is only imperfectly so, but beyond this no definite facets are evident, but merely roughened surfaces for the ligaments.

THE STERNUM.

(Pl. VII., figs. 5, 6, 7 and 8).

The sternum consists of a presternum, a mesosternum of six segments, and a ziphisternum. The presternum is remarkable on account of its strong and prominent keel, which projects downwards and forwards to an extent which is greater than its length in a fore and aft direction (fig. 6 *f*). The lateral wings, which are slightly concave on each side of the keel, articulate (or ankylose) with the first rib, as described under that head, the posterior end of the junction coming right up to, or even encroaching upon the concave articular facet on its hinder face for the first segment of the mesosternum. The inner, or superior, surface of

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the presternum is smooth and concave from side to side; behind, it rises in the mid-line into a small eminence, which supplies most of the before-mentioned facet for the mesosternum, the remainder being furnished by the root of the keel.

The six mesosternal segments (fig. 6 *i*) are compressed from side to side, and slightly expanded at each end, where they articulate with one another.

The first two are of equal length, and each is nearly as long as the presternum, but the four segments which succeed are only about half as long as these. The sternal ribs abut on the junctions of the mesosternal segments, that of the second meeting the points of contact of the first and second. In the case of the second, third and fourth the abutment is directly at the side of the mesosternal junction; while in the case of the fifth, sixth and seventh the ends of the sternal ribs lie ventral to the mesosternum, and almost meet one another in this position.

The ziphisternum (fig. 7) is a slender bony rod nearly as long as the first segment of the mesosternum, having for its terminal portion a flat cartilaginous expansion.

THE SHOULDER GIRDLE.

(Pl. VIII., figs. 1, 1a, 1b and 3b).

The scapula is narrow for its inferior, or, in its natural position in the animal for its anterior, two-thirds, but wide superiorly (or posteriorly), owing to the rapid divergence of the glenoid and coracoid borders at their posterior ends. The suprascapular border is thus of considerable extent, and the angles at its junction with the glenoid and coracoid borders, respectively, form prominent hook-like process which turn forwards and inwards (fig. 1).

The mesoscapular spine is well developed (fig. 1 *s*). Rising from almost the whole length of the bone, it is carried forward to form a long acromial process, leaving a deep notch between this and the scapular neck; it is besides much inflected, so as to overhang the postscapular fossa.

The postscapular fossa, much wider than the prescapular, gives origin to a well-developed second spine which lies nearer to the glenoid border than to the mesoscapular spine. Near the glenoid cavity it runs almost flush with the glenoid border—indeed, at that part one might describe the glenoid border itself as being turned up to form the second spine. (fig. 1 *gb. ss).* The free edge of this second spine in parts so nearly approaches the edge of the overhanging mesoscapular spine as almost to convert the groove between them into a tube; as it is, it is an exceedingly deep canal (figs. 1., 1a., 1b.) Approaching the scapular neck, this second spine still further rises into a marked flat process, (fig. 1 *p*) which

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gives attachment to a ligament passing to the hinder border of the acromion. Between this process *(p)* and the glenoid cavity is the neck.

The coracoid border terminates in a very small coracoid process (fig. 3b *c*) which blends with the margin of the glenoid fossa, and in fact may be said to share in the formation of the articular surface. It gives attachment to a coraco-acromial ligament. The subscapular fossa is slightly concave from the glenoid to the coracoid border.

The glenoid surface is subtriangular in shape, and concave.

A considerably elongated mesoscapular segment is connected with the acromial process, and continues this forwards and inwards (figs. 1, 3b *m.s.s.*). To its bevelled end is attached the clavicle.

The clavicle (figs. 1, 3b *cl.*) is a very slender, curved, styliform bone, which ends in an enlarged sternal extremity. This, however, does not reach the sternum, but it is continued onwards as a ligament about half a centimetre in length, which is attached to the anterior border of the keel of the manubrium sterni.

THE ARM AND FOREARM.

(Pl. VIII.. figs. 2—5a).

The humerus (figs. 2—3b) is a stout, strong bone, with its inferior extremity very much widened from the great extension inwards of the internal epicondyle. The head is rounded, and there are well-marked external and internal tuberosities. The ectocondylar and deltoid ridges are well-marked, and the musculospiral groove wide and deep. No supratrochlear or supracondylar foramen. The trochlear surface is almost completely divided by a deep notch into two portions, of which that for the radius is the larger. The internal epicondyle terminates in a hook-like process.

The ulna (figs. 4, 5) is remarkable for its long and much incurved olecranon process, the length of the process being nearly as great as that of the shaft. The shaft, wide above, from before backwards, and grooved on its hinder surface, tapers to a slender rod below, which curves a little outwards and backwards, and has a small blunt styloid process. In the natural position, the ulna lies behind the radius for its whole length. The surface of articulation for the humerus is deeply concave from above downwards, and its inferior lip constitutes a coronoid process. The superior lip is also prominent. Externally is a concave surface, for the head of the radius, which is bounded superiorly by a prominent lip.

The radius is about half the length of the ulna, including the olecranon. Its head is considerably expanded, and so, also, is its inferior extremity, from which proceeds a styloid process. Its articulation with the ulna and with the humerus has

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been sufficiently described. Below, the radius and ulna together articulate with the lunar, cuneiform, and a large bone which will be described as the scapho-carpal, the radius taking the greatest share in the formation of the joint.

THE MANUS.

The manus (Pl. VIII., figs. 5 and 5a) is so distorted, and presents so many departures from the typical structure, that I cannot, with my limited experience in comparative osteology, be quite certain of the homologies of the different parts. Its features are best seen from the palmar surface. Figure 5 represents that of the left side enlarged to two and a half times, and, in order that the details of the structure may be better shown, a large palmar sesamoid bone (fig. 5a) has been removed; the relations of this will be better understood when the other parts have been described. The central figure and most conspicuous feature of the hand is a large irregular bone which extends almost completely across the carpus, and which has its palmar surface raised somewhat above the level of the remaining bones. It is indicated in fig. 5 by *sc*, as well as by the two crosses nearest the radial side; a foramen pierces it from above downwards, the position of which is indicated by the curved arrow. Articulating with the radius on its extreme radial side, it occupies the place of the scaphoid, but from its relation to the digits, with all of which it articulates, it seems to represent also the carpalia (I—V), and I will therefore, for the sake of convenience in description, term it provisionally the scapho-carpal. Lying between it and the radius, and visible only from the dorsal side, is a small bone, not shown in the figure, about the size of a pin's head, which I take to be a diminutive lunar; succeeding this on the ulnar side, and articulating with the ulna, is a semilunar-shaped bone, which is doubtless the cuneiform *(cu)*. The scapho-carpal has on its inferior aspect, and towards the palmar surface, a small concave facet, which carries a metacarpal-like bone (fig. 5 *r*). This supports two phalanges of the second digit, the more distal terminating in a long narrow claw. To the same metacarpal, as well as to the base of the proximal of its two phalanges, is attached, by ligamentous connection, the slender representative of the pollex, which also is composed of two segments, the terminal one ending in a claw. These are the two digits which are, as has been described, folded over towards the palmar surface of the manus, and form the inner of the two rows which bound the palmar cleft. Immediately to to the dorsal side of the facet for the bone described above as the metacarpal *(r)* common to the second digit and pollex is another for, what appears obviously, the metacarpal of the third digit *(s* and *s)*;

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this is articulated to, and carries, a single phalanx, which is fused with the long claw *(c)*. Still more to the ulnar side of the scapho-carpal, articulating with it and projecting beyond it towards the ulnar side, is a bone *(t)* very wide in a radio-ulnar direction, which seems a greatly widened metacarpal, for it is articulated to, and carries, the large triangular claw of the fourth digit *(d)*.

If, therefore, I am correct in these homologies, each of the third and fourth digits possess one phalanx only, with which is firmly fused the corresponding great claw.

Articulating with that described as the cuneiform is an elongated bone, pointing superiorly, which appears to be an elongated pisiform (fig. 5 *p*). Parallel to this, and lying so much to its dorsal side that it is partially concealed by the pisiform in the palmar view represented in the figure, is an elongated metacarpal-like bone (fig. 5 *u*), which, by its proximal extremity, articulates with the scapho-carpal. This I take to be the metacarpal of the fifth digit, and it together with the pisiform support at their distal extremities a broad stumpy nail (*e*).

Lying on the palmar surface of the manus is a considerable bone before alluded to, which appears to be a palmar sesamoid. As has been stated, it is not shown in position, for it would have obscured other parts, but it is represented separately, with its palmar aspect turned towards the observer (fig. 5a). By its forked distal extremity it articulates with two facets on the large claw-bearing phalanges representing the third and fourth digits. These are marked *y.y* in fig. 5, and if, in the sketch, they appear too wide apart to correspond with the forks of the sesamoid bone, it is because the two digits have been somewhat separated to allow of better representation. By the proximal extremity this sesamoid articulates with a surface having three facets *(x.x.x)*, two of which are furnished by the scapho-carpal, and one by the pisiform. From its position it forms a sort of buttress or prop for the third and fourth digits, and in the same way the pisiform forms a support for the fifth.

THE PELVIC GIRDLE.

(Pl. IX., figs. 1, 2, 3 and 4.)

The pelvis lies very obliquely, nearly approximating to the horizontal. There is no indication of separation between its constituent bones.

The ilium is rod-like and trihedral in its middle part, with its faces looking downwards and outwards, downwards and inwards, and nearly directly upwards respectively. Anteriorly these surfaces gradually widen, and eventually the bone fuses with the body, metapophysial and transverse processes of the first, with the body and transverse process of the second, and with the transverse

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process, only, of the third sacral vertebra. Posteriorly, the narrow rod-like portion of the ilium widens towards the acetabulum. The pubic elements come together at a wide symphysis, and are completely ankylosed. The posterior edge of the pubic and the ischial portion of the pelvis diverge as they ascend, and the latter fuses with the metapophyses and transverse processes of the two last sacral vertebræ. The posterior outlet of the pelvis has a markedly triangular outline (fig. 4). The acetabulum is circular and deep, and has a wide cotyloid notch posteriorly; it is imperforate, but its internal wall is very thin. A round ligament exists.

The obturator foramen, nearly circular, is situated below and behind the acetabulum, and is about one-third of its diameter.

MARSUPIAL BONES.

These are two very small osseous nodules, slightly divergent anteriorly, which lie in the tendon of the external oblique muscles of the abdomen, close to their attachment to the anterior border of the pubic symphysis. They are scarcely visible without a lens, and are consequently liable to over-looked.

THE THIGH AND LEG.

(Pl. VIII., figs. 6 and 7.)

In the femur (fig. 6), the head is approximately spherical, but tapers somewhat to a blunt conical point; it is marked by a small depression for the round ligament. The neck is short and constricted, standing out almost at right angles to the shaft, and there is a small but conspicuous tubercle at the junction of the front border of the neck with the shaft.

The great trochanter is much compressed antero-posteriorly, and very broad from above downwards. The lesser trochanter is a small conical process pointing inwards and backwards, situated at the junction of the inferior and posterior border of the neck with the shaft (fig. 6 *l.t*). The latter is somewhat flattened from before backwards, and widens into an inferior extremity, which presents two condyles, separated in the posterior half of the articular surface by a deep and narrow notch. Besides articulating with the tibia a large portion of this articular surface, by its superior and front part, articulates with the large patella and the external condyle, on its outer side, also articulates directly with the fibula by a surface which is continuous with that for the tibia and patella.

The shaft of the tibia (fig. 7) is very broad, and expanded in an antero-posterior direction in the upper half, this being due to the projection forwards of the anterior border as a prominent ridge. The bone narrows gradually to the junction of the middle and inferior third where it becomes subtriangular in section. The

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lateral surfaces of the expanded part are slightly concave, and the upper articular surface is much elongated from before backwards and deeply grooved in its front half for the patella. In the posterior part there is an articular surface separated into two facets by a notch. The inner, and larger, is concave; the outer, and smaller, is convex, and is placed upon an outwardly projecting process. Both of these are for the femur. On the outer and under surface of the projecting process, just mentioned, and continuous with that for the femur, is a small flat facet for the fibula.

The inferior extremity articulates with the fibula, and is prolonged into an internal malleolus.

The shaft of the fibula (fig. 7) is slender, lying so far behind the tibia, as to stand almost clear of its posterior border. Its upper extremity is expanded into two flattened, and almost hook-like processes, which project fore and aft, and, on the inner surface of the bone, at the junction of the shaft with these expansions, is an articular facet looking upwards and inwards, which is partly for the tibia and partly for the femur. Of the expanded processes, the anterior comes to a point, but the posterior terminates behind in a broad slightly inflected border. Midway between the two and immediately above the facet for the superior tibio-fibular articulation is a large foramen *(o)*.

Below, the shaft expands into an inferior extremity, which is prolonged into an external malleolus, and the tibia and fibula together furnish an articulation, concave from side to side, for the astragalus.

The patella (fig. 7 *p*) is relatively very large and irregular, and generally flattened from side to side for the anterior two-thirds; in the remainder it is somewhat laterally expanded. On its posterior face it has a large flat facet, which plays upon the inferior femoral articulation, as described under that bone. The inferior border is brought to a sharp ridge, which fits into the groove, described as existing, upon the front part of the head of the tibia. The outer surface is somewhat concave from before backwards; the inner rough.

THE PES.

(Pl. VIII., figs. 8, 8a, 8b.)

The pes departs so much less from the normal type than the manus, that I need only confine myself to a description of the parts which present peculiarities.

The calcaneum extends considerably backwards as a long bony spur (fig. 8 *ca*). The scaphoid (*sc*), deeply concave towards the heel, articulates in front with a considerable internal and small middle cuneiform (*ic* and *mc*). These two carry respectively the hallux and second digit. There is a large irregular cuboid (*cu*), which

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may represent also the external cuneiform; it has articulating with it the second as well as the three outer digits.

The digits, five in number, all possess the normal number of bones; and their terminal phalanges bear claws, which have been sufficiently described in a previous paragraph.

The fifth metatarsal however is peculiar, and deserves special mention (fig. 8a). It is immensely expanded towards the plantar aspect, and projects also towards the heel as a flat and blunt unciform process, the hinder extremity of this projection overlaps the calcaneum for nearly half its length. On the inner side of the pes is a large flattened sesamoid bone (fig. 8b), which is attached to the foot by ligamentous union; this also projects sole-wards after the manner of a bilge-keel. This bone, together with the similar plantar projection of the expanded fifth metacarpal, converts the sole into a trough-like groove.

THE SENSE ORGANS.

THE EYE.

No trace of this organ is visible externally, or on removal of the integument, but on reflecting the temporalis muscle it shows as a nearly circular, black lens-like disc on the inner surface of the anterior part of the muscle; it lies directly on the periosteum of the lachrymal bone at a point immediately behind the exact origin of the upper margin of the zygomatic arch, which here begins abruptly with a sharp upper edge and makes a sharp curve downwards and backwards. (Pl. VI., fig. 1.) No structure resembling an optic nerve was visible with the dissecting lens, though, on reflecting the pigment spot from its bed, fine filaments, apparently of connective tissue, were observable stretching between it and the periosteum.

The diameter of the pigmented disc is about ·5 mm. Sections made through it with the Cambridge rocking microtome, show it to be composed of a mass of pigment enclosed in a capsule of fibrous tissue resembling that of ordinary sclerotic, and its innermost layers similarly contain pigment. The inner pigment is accumulated into a large opaque mass, which occupies the greater part of the interior of the capsule, particularly the peripheral region and that believed to be the anterior. In those parts where the accumulation is less dense, or where the pigment is absent, viz., in the posterior and axial parts, the mass can be seen to be made up of small granules of varying size, either darkly pigmented, or yellow and highly refracting. In these situations can be distinguished, also, numerous nuclei, staining readily with borax-carmine solution, which appear to be those of epithelium-like cells.

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Closely adjacent to the fibrous capsule, and covering it to a considerable extent, is a glandular structure of the type of a serous salivary gland, which has, however, certain peculiarities of its own.

In those sections in which the effort was made, and I believe successful, to have them running truly in an antero-posterior direction, there is to be seen evidence of the existence of a relatively large cavity, sac or duct, situated immediately in front of that part of the fibrous capsule, which would correspond to the cornea in the normal eye; in fact the front part of the capsule forms the hinder boundary of the cavity in question. This showed clear indications of an epithelial lining which thus appears to cover the surface of the front part of the capsule in the same way as the normal cornea is covered by its anterior epithilium. The antero-posterior sections passing through the central regions of the disc show the contour of the fibrous envelope to be pyriform, and the posterior and smaller end is continued backwards as a band or bundle of connective tissue, in which, however, no trace of nerve structure can be distinguished.

It should be noted that the sections were made from eyes taken from a specimen which was not in good condition, and also, that the smallness of the object made it difficult to be quite sure that the sections ran truly in the desired directions. Thus, without further investigation, I cannot be absolutely certain of its relations, or of the morphological value of its constituent parts So far, however, I believe my description is correct.

THE EAR.

From the aperture of the ear, the external features of which have already been described, a fibrous or fibro-cartilaginous tube bounds the meatus to the auditory aperture of the bony skull. As I was unwilling to damage any of the limited number of perfect skulls at that time in my possession, I have as yet made no examination of the internal ear.

SALIVARY GLANDS.

(Pl. VIII., fig. 9.)

Below the meatus externus is a large flattened parotid gland, and to the inside of this, overlapping its inner edge and extending inwards so as nearly to meet its fellow on the opposite side, is an equally large flattened submaxillary, showing five or six well-marked lobes. The two glands of both sides form an almost continuous broad band of gland tissue stretching from one meatus to the other.

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MUSCULAR SYSTEM.

I have not been able to devote any of the specimens as yet examined to a detailed examination of the muscular system, nor indeed were any, except one which I have been anxious to preserve, as nearly as possible, intact for future reference, in a very suitable condition for a careful investigation of the soft parts; but generally speaking the muscular system is very well developed, especially on the limbs, pectoral, dorsal and caudal regions. A large mass of nuchal muscles, shown by the dotted line *(l)* in Pl. V., fig. 1, passes from the trunk and reaches to the summit of the occipital region for insertion into the triple ridge described on the posterior part of the vertex of the skull. This muscular mass contributes materially to the obliteration of the neck that has been alluded to.

URINARY AND GENERATIVE ORGANS.

(Pl. IX., figs. 5 and 6.)

The long, straight and wide rectum, lying in the middle line of the body, opens into a cloaca, which receives, also, the genito-urinary products. The anal aperture of this is surrounded with long straight hairs. The urinary bladder, considerably elongated and narrowing from the fundus, lies on, and ventral to, the rectum, and into its posterior narrow extremity the ureters and vasa deferentia open close together, but the former are dorsal to the latter. From the bladder the first portion of the urethra passes posteriorly as a straight tube of considerable length, and then enters the posterior end of the penis, in which, with ordinary dissection, I was unable to distinguish separate spongy and cavernous portions. This organ shows at its root two divergent bulbs, which, coalescing into a single cylindrical body, passes backwards, lying on, and closely adherent to, the ventral surface of the rectal wall. Posteriorly, the penis terminates in a single-pointed extremity, which pierces, as it were, the cloaca, and when this is laid open the tip just appears lying retracted within a recess in its wall, which thus forms for it a sort of preputial sheath (fig. 6); out of this recess the organ can be drawn considerably. On the dorsal aspect of the point of the penis is the slit-like anterior orifice of the urethra, which thus perforates the whole length of the organ.

The testes are oval bodies, which lie between the muscular planes of the abdomen in a position corresponding to the anterior edge of the pubic symphysis; they are therefore prepenial. In the specimens before me there is no trace of an external scrotum, and the organ can scarcely be felt by careful examination from the outside of the body. In the notes forwarded to me by Mr.

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Benham, however, it was stated that "the testes of the male are like those of a cat," which would seem to indicate that they are a prominent external feature. There is apparently a tunica vaginalis, also an epididymis closely applied to the body of the testis, from which the vas deferens runs a nearly straight course to the point indicated in the description of the bladder; both it and the spermatic artery pass through a ring-like aperture in the peritoneum lining the abdominal cavity.

The kidneys are suboval, with smooth surface, and close to them, on the inner side, lie the adrenals of considerable relative size; the course of the ureters is sufficiently shown in fig. 5, and their termination in the bladder has already been described.

On each side of the terminal part of the cloaca, lying embedded in the surrounding connective tissue, is an oval gland, nearly as large as the testis, from which three tube-like structures pass towards the cloaca. Whether any one of these is a duct I am unable to say, nor could I with dissection with an ordinary lens detect an opening within the cloaca, but they all passed towards it, as shown in fig. 5.

Marsupium.—In Mr. Benham's notes he described the female as possessing a pouch which opens backwards, and, in my own preliminary description, I have described such as existing in the following terms:—"About 15 mm. in front of the vent there is a pouch in the integument about four mm. wide, with the opening directed backwards, and having a depth in a forward direction of from four to five mm. The surface of this pouch is devoid of hair, but the bare area is surrounded by thick fawn-coloured fur, with a slightly reddish tint." See Plate V., fig. 3. The condition of this specimen, which was apparently the only female I had then received, made all observations in reference to soft parts of doubtful value.

I am now, however, able to confirm these statements by an examination of the specimens recently obtained, for, four of these are undoubtedly females. Two possess a pouch, which is so well developed as to suggest that it has recently been occupied, and in two the organ is small and rudimentary. In that in which the pouch is largest, a groove in the integument, bounded by two well-marked pillars, begins just in front of the anus, and leads uninterruptedly forward into a *cul-de-sac*, which readily admits a glass rod 5 mm. in diameter. This pouch terminates at a point about 15 mm. in front of the anal orifice, and it thus opens backwards. Sparsely scattered over the integument, lining the interior of the pouch, are reddish hairs; but examination with a hand lens did not enable me to detect any nipple or orifice. A narrow margin of somewhat bare integument

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immediately surrounds the pouch, but outside of this the fur is especially dense and of a darkish red colour.

In the two specimens in which the pouch is rudimentary, a similar but much narrower groove leads forwards from the anus, and ends in a constricted *cul-de-sac*, which barely admits the end of a darning needle. The same area of dense red fur surrounds the region.

All four females are from one to two cm. shorter than the largest male in my possession; but, on the other hand, both the males of the last series are no larger than the average size of the four females.

FOOD:—The intestines of those specimens, the condition of which permitted an examination of the contents to be made, contained the debris of insects, amongst which those of ants were conspicuously recognisable.

In the preceding description of some of the organs no attempt has been made to treat the subject exhaustively. The condition of all the earlier specimens, except one, which I have desired to keep as far as possible unmutilated for future reference, rendered this difficult of accomplishment, and I have been satisfied in making out as far as I could such details as were most obvious, or of chief importance, in determining the affinities of the animal. Unfortunately, no information whatever can be given as to the brain, which, as might be expected under the circumstances, was, in every case, in a state which rendered an examination quite hopeless. As regards the later specimens, though I can plainly perceive that they are not in first-class condition, they yet appear to be much superior to all, except one, of the former series. These I have only examined superficially.

CONCLUDING REMARKS.

For the considerable delay that has elapsed since the publication in the Transactions of this Society, and subsequently in the correspondence columns of "*Nature*," of some preliminary notes on the structure of this new marsupial, I must seek the indulgent consideration of naturalists, both in Australia and in England, who have, not unnaturally, been looking forward to a more complete description of a new animal of the greatest possible interest from many points of view. No one has regretted the delay more than I have. In extenuation, I must be allowed to say that scientific workers in the old world may not quite realize the difficulties under which some of their colleagues in the new have to labour. Many of these, primarily teachers, are not only, without adequate assist-

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ance, overburdened with routine courses of lectures of inordinate length, but have also thrown upon them large administrative duties in their self-imposed efforts to found and sustain, on a creditable footing, scientific societies and institutions in countries where, as yet, science meets with little general support or sympathy, and where its pursuit is often looked upon as an amiable craze. Lastly, the imperfections and deficiencies of our Libraries and Museums—though these are rapidly improving—still leave much to be desired in the way of literature for reference and material for comparison.

Under all these unfavourable circumstances, which perhaps are to be expected in a young community, it is not surprising that those of us who are teachers of science in Australia have hitherto suffered the humiliation of seeing so much of the work on purely Australian subjects done elsewhere. The scientific prizes of the investigator, of first importance, have not unusually been, so to speak, snatched from under his very eyes.

Such being the case, in spite of a strong appeal to have the work, involved in the present investigation, done in England, I was anxious that it should, if possible, be retained in the colony in which the discovery was made.

It was possible to desire this and at the same time to admit freely that the work might have been better done if undertaken by those whose vastly superior competence must be at once acknowledged. As an additional reason for this wish, of a somewhat personal character, it is not, perhaps, out of place to say that, being, since the discovery of the animal, either a member of the Council, or President, of this Society, a feeling of loyalty towards both it and the colony, strongly suggested that I should, by the destination of the paper, gain for both whatever scientific credit might accrue from its local publication. The delay would not have been so great had I not felt bound to avail myself of very favourable opportunities that presented themselves, of visiting remote parts of New Zealand and the little known regions of Central Australia, during two successive long vacations, during which periods I have leisure to undertake independent work satisfactorily. Indeed, as previously stated, the latter journey of over 2,000 miles, of which over 1,200 had to be performed by driving, or riding on horseback or on camels, was undertaken largely with the hope of obtaining a further supply of specimens of this animal. I think I may fairly offer the sucessful result of the journey, in this respect, as an adequate compensation for some, at least, of the delay, for which I am responsible, as I shall now be able to submit examples to the examination of more competent

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zoologists than myself, and thus to afford an opportunity of inspection by those interested in the discovery.

As has already been stated, the generic name originally proposed was Psammoryctes (sand-burrower, Gr.), but during my absence in North Australia I was made aware through information emanating from my old friend and teacher, Professor Newton, of Cambridge, whom in this matter, as well as in many others, I have to thank for acts of kindly interest and encouragement, that this name had already been appropriated for another group of animals, viz., by Pöppig in 1836 for a genus of mammals, and again by Vejdovsky, in the Zeitschrift fur Wissenschaftliche Zoologie for 1876, for a genus of worms. Psammorycter, which is practically the same word, was used by Blanchard in 1840 for a genus of Diptera. Professor Newton suggested Notoryctes as being appropriate, in view of its Australian habitat, and this name is, I think, preferable to Neoryctes, which had been previously proposed by Dr. Sclater. Though I regret extremely that the original name is preoccupied, as its sand-burrowing habits are so eminently the characteristic feature of its life, I think the new one will be regarded as satisfactory. As to the specific name, the extremely rudimentary condition of its eyes at once recommended it as suitable.

In view of the remarkable peculiarities of structure presented by the sub-class Marsupialia, and of the fact that we find amongst it analogous representatives of most of the orders of Mammalia, it has seemed not a little remarkable that hitherto no marsupial has been found with mole-like habits. In Notoryctes we have such a form developed to an extreme degree, and I regret that the exigencies of publication and the desire not to increase the delay which has already occurred in the preparation of this paper, together with the disadvantages, under which we labour in our work, to which I have alluded, make it undesirable for me now to attempt to enter into the many questions of interest, which are suggested by the structure of so singular a type. Certain osteological comparisons with existing forms are at once obvious, but I believe these may also be made, in respect of the dentition, with that of some of the Mesozoic mammals, to which, unfortunately, I can only refer by plates. Into these important questions, however, I cannot, with the time and means at my disposal, now attempt, even perfunctorily, to enter; and I can only hope that the description, so far as I have given it, will enable others to form their own conclusions.

In a subsequent paper I hope to embody the results of a more detailed examination of the organs, for which I hope the specimens now at my disposal will provide sufficient material in a suitable condition.

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In conclusion, my best thanks are due to Miss Rosa Fiveash for the very great pains bestowed upon the drawings which illustrate this paper. Accurately and carefully drawn to scale, they will in many instances supply useful information as to size and form, and render more intelligible my own imperfect descriptions. To Mr. H. Barrett, of the South Australian Government Printing Office, my thanks are also due for his careful reproduction of the plates, and to the Executive of South Australia for permitting the work of a scientific society to be done in a public institution.

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Descriptions of New Australian Lepidoptera.

By E. Meyrick, B.A., F.Z.S.

[Read June 2, 1891.]

SYNEMONIDÆ.

Synemon.

Syn. leucospila, n. sp.

Male and female, 31-42 mm. Head, thorax, abdomen, and legs dark fuscous, somewhat sprinkled with whitish. Palpi whitish, above dark fuscous. Antennæ dark fuscous, ringed with white. Forewings elongate-triangular, hindmargin rounded, rather oblique; rather light fuscous-grey; base and anterior half of costa suffused with dark fuscous; an irregular suffused dark fuscous fascia before middle, formed of three rounded confluent spots, uppermost and sometimes others also margined posteriorly with an ochreous-white suffusion; a roundish dark fuscous blotch beneath costa beyond middle, posteriorly margined by an ochreous-white suffused band or series of spots; two rows of cloudy dark fuscous spots before hindmargin, and a third marginal: cilia grey, tips whitish or white. Hindwings blackish-fuscous; a roundish pale yellowish discal spot; a yellow-whitish subterminal band, not reaching costa or inner margin, often divided into four or five spots, of which the middle one is often very small or absent; a submarginal series of seven white spots, three upper small, others rather large, lowest suffused; cilia fuscous, tips white.

Geraldton, West Australia; abundant on the plains near the town in November. The species is very distinct by its white or whitish markings.

Syn. heliopis, n. sp.

Male and female, 27-35 mm. Head, thorax, and abdomen fuscous. Palpi snow-white. Antennæ dark fuscous, ringed with white. Legs fuscous, femora white beneath, tibiæ ochreous beneath. Forewings elongate-triangular, hindmargin strongly rounded, rather oblique; fuscous, sometimes rather darker in disc; a narrow oblique transverse white median discal spot; a very obscure suffused band of light grey scales extending beneath middle from base to beneath discal spot and thence along upper half of hindmargin to apex; a slightly curved band of about five subconfluent small ochreous-whitish suffused spots on upper hal

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of wing at three-fourths: cilia fuscous. Hindwings blackish-fuscous, ferruginous-tinged; a small suffused orange discal spot; a very broad deep orange hindmarginal band, not reaching costa, suffused at anal angle, including a submarginal series of small subconfluent blackish-fuscous spots, becoming larger on lower half; a blackish-fuscous hindmarginal line: cilia fuscous.

Geraldton, West Australia; in November, five specimens. This and the two following species are nearly together, but certainly distinct; *S. heliopis* may be recognised by the narrower transverse discal spot of the forewings, the fuscous cilia, larger discal spot of hindwings, and very broad orange band, with a series of well-defined dark spots in both sexes.

SYN. AUSTERA, n. sp.

Male and female, 40 mm. Head, thorax, and abdomen whitish-fuscous. Palpi snow-white. Antennæ dark fuscous, ringed with white. Legs whitish-ochreous. Forewings elongate-triangular, hindmargin strongly rounded, rather oblique; pale fuscous, ochreous-tinged; veins partially marked with blackish-fuscous lines, an irroration of grey-whitish scales forming a band beneath middle from base to two-thirds, thence curved upwards to costa at four-fifths, and also a narrower band along hindmargin, partially confluent with preceding above middle; a triangular white median discal spot; a faintly marked ochreous-whitish suffusion preceding the subterminal band on upper half of wing, divided into spots by dark veins: cilia whitish-ochreous, with one or two fuscous lines, tips whitish. Hindwings dark fuscous; in female a suffused orange discal dot; an orange fascia extending from middle of wing to apex, somewhat dilated upwards; in female a suffused submarginal series of cloudy orange spots before upper two-thirds of hindmargin; cilia whitish, basal third fuscous.

Carnarvon, West Australia; in October, two fine specimens taken together in a damp place on the plain. Easily distinguished from the preceding and following by its larger size, lighter colouring, the triangular discal spot of the forewings, and the less extended orange colouring of the hindwings.

SYN. BRONTIAS, n. sp.

Male and female, 25-33 mm. Head, thorax, and abdomen fuscous. Palpi snow-white. Antennæ dark fuscous, ringed with white. Legs fuscous, sprinkled with white beneath. Forewings elongate-triangular, hindmargin obliquely rounded; fuscous, somewhat suffused with darker in disc, and sprinkled with grey-whitish below middle and towards hindmargin; an ill-defined roundish ochreous-white discal spot; a sinuate band of suffused whitish spots, separated by dark veins, at about two-thirds nearly

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reaching costa and inner margin; two faintly defined series of elongate darker fuscous spots before and beyond this; cilia fuscous, mixed with whitish. Hindwings dark fuscous; an orange discal dot; a broad orange hindmarginal band, hardly reaching apex, suffused towards anal angle, including in male an undefined submarginal fuscous suffusion, in female a series of four or five cloudy dark fuscous spots; a dark fuscous hindmarginal line; cilia fuscous, mixed with whitish.

Carnarvon, West Australia; in October, four specimens on the plain. Somewhat smaller than *S. heliopis*, and distinguishable by the roundish discal spot of forewings, the two posterior series of indistinct darker spots, the series of whitish spots nearly reaching both margins, the cilia mixed with whitish, and the dark subterminal spots of hindwings represented in male by an undefined suffusion.

LIMACODIDÆ.

Momopola, n. g.

Antennæ one-half, in male bipectinated throughout, but pectinations on terminal half extremely short. Palpi moderate, porrected, with dense appressed scales. Forewings with veins 7 and 8 out of 9, 10 out of 9 below 7. Hindwings with veins 6 and 7 stalked.

Mom. miltogramma, n. sp.

Male, 34 mm. Head, palpi, thorax, and abdomen light orange, mixed or tinged with red. Antennæ greyish-ochreous, pectinations *a* 4, *b* 6. Legs orange mixed with red hairs, tarsi black ringed with white. Forewings triangular, hindmargin rounded, rather oblique; pale whitish-grey; costal edge reddish-orange; all veins marked with broad crimson-red streaks, paler posteriorly; some dark grey irroration towards base in middle; a small median discal spot of blackish irroration; two transverse sinuate streaks of blackish irroration, not reaching costa, first beyond middle, touching discal spot, second subterminal: cilia pale yellow. Hindwings pale rosy; cilia pale yellow.

Queensland; one specimen received from Mr. Diggles.

BOMBYCIDÆ.

Bombyx, *Schrk.*

Bomb. mioleuca, n. sp.

Male, 35 mm.; female, 50 mm. Head, palpi, thorax, abdomen, and legs mixed with dark fuscous and whitish hairs, appearing grey. Antennæ dark fuscous, pectinations ochreous-orange in male 10, in female 3. Forewings elongate-triangular, hind-

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margin obliquely rounded; fuscous, mixed with whitish and dark fuscous hairscales; costal edge in male dark fuscous; two strong dark fuscous lines, first from quarter of costa to two-fifths of inner margin, rather irregularly sinuate, second from before two-thirds of costa to beyond middle of inner margin, with a slight angular dentation outwards above middle, and somewhat bent inwwards below middle; a small transverse-oval fuscous-whitish discal spot before middle, circled with blackish; an indistinct irregular subterminal series of darker spots: cilia whitish, barred with dark fuscous. Hindwings dull whitish; cilia whitish, barred with dark fuscous.

Mount Lofty, South Australia; a pair received from Mr. E. Guest, who has taken others.

LIPARIDIDÆ.

Darala, *Walk.*

Dar. xantharcha, n. sp.

Male, 63 mm. Head fuscous. Antennæ blackish, stalk sprinkled with pale yellowish. Thorax blackish, somewhat mixed with whitish and ferruginous hairs. Abdomen ferruginous-red, anal-tuft yellow-whitish. Legs blackish, sprinkled with pale yellowish, hairs of femora partly ferruginous-red. Forewings triangular, hindmargin rounded, somewhat oblique; dark fuscous, densely strewn with white hairs, and a few bright ferruginous scales; three waved blackish-fuscous lines, first from one-fourth of costa to one-third of inner margin, sharply angulated above middle, second and third close together beyond middle, slightly curved inwards; a small, round, white black-circled discal spot above middle, immediately preceding second line; a moderate hindmarginal band nearly without white irroration, its anterior edge straight, dentate. Hindwings pale whitish-yellow, deeper towards base, with some orange hairs in submedian fold; a faint grey straight median line; a broad dark-grey hindmarginal band, irrorated with whitish-yellowish, anterior edge faint and preceded by a series of faint grey spots, and including a faint pale dentate subterminal line. Undersurface of all wings whitish, with a black discal dot and median line; disc of forewings orange, with white black-circled spot as above.

Koolunga, South Australia; one specimen in the collection of Mr. E. Guest. It is a handsome and extremely distinct species.

Dar. protocentra, n. sp.

Male, 48 mm. Head, palpi, thorax, abdomen, and legs dull brown-reddish. Antennæ whitish, pectinations reddish-fuscous (10). Forewings triangular, hindmargin rounded, little oblique;

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rather light brown-reddish, with a slight ochreous suffusion; a white discal dot at one-third, and a second in middle; an indistinct, slender, waved, slightly curved, darker, reddish postmedian line; a slightly curved subterminal series of black dots. Hindwings with groundcolour and subterminal dots as in forewings; an indistinct, slightly sinuate reddish line at one-third, and another in middle.

Fernshaw, in Victoria; one specimen in November.

DAR. ASTERIAS, n. sp.

Male, 38 mm. Head, palpi, antennæ, thorax, abdomen, and legs rather light brown-reddish; antennal pectinations dark fuscous (12). Forewings triangular, hindmargin rounded, slightly oblique; rather light brown-reddish; a white dot, obscurely circled with dark fuscous, in disc at two-fifths, and a second at three-fifths. Hindwings rather light brown-reddish.

Melbourne, Victoria; one specimen in November.

OCNERIA, *HS.*

OCN. HELIASPIS, n. sp.

58-60 mm. Male. Head and thorax bright ferruginous. Palpi pale orange. Antennæ fuscous, pectinations pale rosy-fuscous (7). Abdomen light reddish-orange. Legs whitish, anterior and middle tibiæ mixed with blackish. Forewings triangular, hindmargin oblique, hardly waved, with a marked sinuation inwards in middle; ferruginous; five obscure cloudy darker slightly curved lines, marked with fine dark grey irroration, first two before middle, third postmedian, fourth and fifth waved, subterminal; a blackish median discal dot; hindmargin partially suffused with darker. Hindwings with hindmargin rounded, inner margin long, so that anal angle appears produced; bright deep orange; faint traces of two fine waved darker lines beyond middle; lower third of hindmargin rather broadly suffused with fuscous.

Female. Head, palpi, thorax, and abdomen ochreous-whitish. Antennæ dark fuscous, pectinations 2. Legs fuscous. Forewings triangular, hindmargin oblique, almost straight; ochreous-grey-whitish; a blackish-grey median discal dot; two fine waved dark grey lines, representing third and fourth of male, first faint. Hindwings formed as in male, but anal angle less produced; ochreous-whitish, faintly rosy-tinged; a cloudy grey discal dot; two grey lines as in forewings, but very faint.

Newcastle, New South Wales; three specimens.

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Laelia, *Stph.*

Lael. eremaea, n. sp.

Male and female, 30-34 mm. Head and palpi pale ochreous-orange. Antennæ white, pectinations ochreous-fuscous, in male 14, in female 1. Thorax ochreous-white, anteriorly suffused with pale ochreous-orange. Abdomen ochreous-whitish, in female orange beneath and tinged with orange posteriorly above. Legs ochreous-orange. Forewings somewhat elongate-triangular, in male more elongate, hindmargin somewhat obliquely rounded; rather thinly scaled, whitish-ochreous, paler in female, costa more ochreous, especially in male. Hindwings in male whitish-ochreous, in female more whitish.

Duaringa, Queensland; five specimens received from Mr. G. Barnard. This species, apparently common, stands in some collections as *obsoleta*, F., but I think erroneously; Fabricius' species seems to be rightly identified as a *Porthesia* (the common white Acacia-feeding species).

Porthesia, *Stph.*

Porth. anacausta, n. sp.

Male, 33-34 mm. Head white. Palpi orange. Antennæ whitish, pectinations blackish (*a* 12, *b* 14). Thorax, abdomen, and legs white; breast and anterior femora and tibiæ orange, anterior tarsi fuscous above. Forewings rather elongate-triangular, hindmargin obliquely rounded; white, very faintly rosy or ochreous-tinged; a small dark grey suberect mark at anal angle. Hindwings white.

Tasmania; four specimens received from Mr. G. Barnard.

Porth. hololeuca, n. sp.

Male, 31-33 mm. Head white, lower part of face tinged with orange. Palpi orange. Antennæ white, pectinations light ochreous (*a* 10, *b* 12). Thorax, abdomen, and legs white; breast and anterior femora and tibiæ orange, anterior tibiæ fuscous above. Forewings elongate-triangular, without markings. Hindwings white.

Female, 34 mm. Head, palpi, antennæ, thorax, and legs white; antennal pectinations *a* 5, *b* 7; anal tuft orange. Forewings more elongate than in male, hindmargin more oblique; ochreous-white; a blackish dot in disc at three-fourths, and a smaller one rather near and directly beneath it. Hindwings white.

Mount Lofty, South Australia; Geraldton, West Australia; in November, five specimens.

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PORTH. IOBROTA, n. sp.

Male, 23-25 mm. Head, palpi, antennæ, thorax, abdomen, and legs deep orange; antennal pectinations *a* 8, *b* 10. Forewings triangular, hindmargin rather obliquely rounded; ferruginous-orange, tinged with brownish, except towards anterior half of costa; in one specimen with ill-defined first and second lines of whitish-ochreous scales—first from one-third of costa to two-fifths of inner margin, somewhat angulated above middle, second from two-thirds of costa to two-thirds of inner margin, obtusely angulated in middle. Hindwings brownish-orange.

Queensland; three specimens (coll., Lucas).

PORTH. PYRAUSTIS, n. sp.

Male, 19 mm. Head, palpi, antennæ, thorax, abdomen, and legs orange; antennal pectinations 8. Forewings triangular, hindmargin obliquely rounded; rather dark ferruginous-fuscous, basal half strewn with ferruginous-orange hairs except along costa; costal edge orange: cilia wholly orange. Hindwings dark grey; cilia grey, becoming pale ochreous towards tips.

Queensland; one specimen received from Mr. G. H. Raynor.

NOCTUIDÆ.

AGARISTA, *Leach.*

AGAR. PLATYXANTHA, n. sp.

Male, 47-53 mm. Head and thorax as in *A. Donovani;* abdomen orange, two basal segments black, rest with narrow black basal rings. Forewings as in *A. Donovani*, except as follows:—All spots larger and yellower; a yellow suffusion near base below middle; a large yellow additional spot between veins 1 and 2 before anal angle. Hindwings as in *A. Donovani*, but fascia broader and yellower, preceded by a quadrate yellow discal spot almost confluent with it below middle.

Female, 40-48 mm. Forewings as in *A. Donovani*, but hindmargin less oblique; markings yellow, first discal spot almost obsolete, second more oval, a small distinct additional spot between veins 1 and 2 before anal angle, cilia not dotted on upper half. Hindwings as in *A. Donovani*, but fascia between veins 4 and 6 projecting further posteriorly.

Cooktown and Cairns, Queensland; six specimens (coll., Macleay); there is also one unnamed in the British Museum. I think the sexes are rightly placed together; the differences between them them are quite analogous to those found in *A. Kochii.*

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AGAR. TETRAPLEURA, n. sp.

Female, 48 mm. Head, palpi, and thorax black, sprinkled with whitish-yellowish dots. Abdomen black, segmental margins whitish-yellowish, apex orange. Legs black, apex of joints white, hairs of coxæ orange. Forewings somewhat elongate-triangular, hindmargin rounded, somewhat oblique; purplish-black; a few scattered white scales towards base, forming a ring beneath costa; a rather narrow, straight, irregular-edged fascia of six partially confluent whitish-yellow spots from costa beyond middle to hindmargin above anal angle, but not quite reaching margins; a short line of a few white scales from costa at two-thirds: cilia purple-blackish, round apex snow-white. Hindwings purple-black; a nearly straight, rather narrow, entire whitish-yellow fascia from beneath costa at two-thirds to inner margin above anal angle, outer edge waved, and sinuate below middle; a small triangular whitish-yellow apical spot; cilia purple-blackish, round apex whitish-yellow.

New South Wales; I have one fine specimen of this very distinct species, of which I unfortunately omitted to record the locality when captured, now 13 years ago; but I believe it was on the hills above the Bulli Pass.

CALLIPYRIS, n. g.

Face rounded; ocelli present; tongue developed. Antennæ in male filiform, rather strongly ciliated (2). Palpi moderate, porrected, second joint with appressed scales beneath, projecting triangularly above towards apex, terminal joint short, obtuse. Thorax and abdomen without crests. Tibiæ rather densely scaled, not spinose. Forewings with veins 7 and 8 out of 9, 10 anastomosing with 9. Hindwings with vein 5 well developed, parallel to 4, 6 and 7 from a point. Probably allied to *Sophta* and *Sventia*.

CALL. DROSERA, n. sp.

Male and Female, 15-19 mm. Head antennæ, thorax, and abdomen deep reddish-ochreous, thorax and abdomen with brilliant silvery-metallic gloss. Palpi and legs orange, anterior legs reddish-ochreous. Forewings rather elongate-triangular, apex tolerably pointed, hindmargin forming a strong obtuse projection below middle on vein 3, concave above this and slightly sinuate below it; fuscous, more or less tinged with reddish-ochreous anteriorly and towards costa, irregularly strewn with brilliant silvery-metallic scales; a fine whitish line at one-third, white towards costa, angulated outwards above and below middle, inwards in middle; an oblique snow-white streak from costa beyond middle, emitting an obscure whitish line to three-fourths of inner margin,

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angulated similarly to hindmargin; costal streak followed by a triangular orange costal blotch, containing two white dots on costa; hindmarginal area deep ferruginous mixed with orange, becoming orange at apex and anal angle, containing a submarginal streak of mixed bright violet and brilliant silvery-metallic scales: cilia ochreous-orange, terminal half paler. Hindwings with hindmargin waved, slightly bent below middle; orange-yellow, paler towards costa; a short erect streak of mixed dark grey and silvery-metallic scales from inner margin in middle, a similar streak of violet and silvery-metallic scales from inner margin above anal angle, and a third at anal angle; a suffused orange-fuscous hindmarginal fascia; cilia ochreous-orange, terminal half paler.

Brisbane, Queensland; Sydney, New South Wales; in September and March, three specimens, appearing to frequent swampy places.

THALPOCHARES, *Ld.*

THALP. BASILISSA, n. sp.

Male, 20 mm. Head pale yellow, front of collar white. Palpi rosy-whitish, terminal joint fuscous. Thorax deep yellow, with a whitish-rosy central dorsal stripe. Abdomen whitish-ochreous, yellow on back near base. Forewings triangular, apex rectangular, hindmargin bowed, little oblique; bright deep yellow; costal edge rosy on basal third; a fine straight white line from two-fifths of inner margin to three-fifths of costa, thence continued along costa to near apex; terminal half beyond this line bright crimson-rosy, slightly tinged with yellow-ochreous except anteriorly; a moderately broad straight yellow-ochreous fascia from inner margin before anal angle to near costa before apex, but not reaching it, marginal towards costa with two or three white dots on veins, and posteriorly with two or three black dots: cilia bright rosy, terminal half snow-white. Hindwings whitish, towards inner margin yellowish; a suffused grey hindmarginal fascia, becoming rosy at anal angle; cilia dark grey mixed with yellowish, and at anal angle with rosy, terminal half snow-white.

Queensland; one specimen received from Mr. Diggles; very distinct.

THALP. PYRASPIS, n. sp.

Male and Female, 14-17 mm. Head, palpi, antennæ, and thorax dark fuscous; palpi beneath and at apex of second joint whitish-ochreous. Abdomen dark fuscous, partially suffused with orange. Legs dark fuscous, apex of joints whitish-ochreous. Forewings somewhat elongate-triangular, hindmargin obliquely rounded; dark slaty-fuscous, sometimes mixed with reddish anterior half marked with several irregular black transverse lines,

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bounded by a nearly straight black line from middle of costa to two-thirds of inner margin, forming a short triangular projection in middle; terminal half more or less mixed or suffused with whitish, usually forming a broad fascia, anteriorly sharply defined, posteriorly suffused beyond this line, and a more or less entire hindmarginal fascia, sometimes strongly mixed with orange: cilia dark fuscous, with a white patch at apex, and another above anal angle. Hindwings bright deep orange; a moderate dark fuscous hindmarginal fascia; cilia dark fuscous, terminal half grey-whitish, slightly rosy-tinged.

Duaringa, Queensland; received commonly from Mr. G. Barnard. This and the next species are allied together, but very distinct from anything else.

THALP. CHRYSASPIS, n. sp.

Female, 20 mm. Head, palpi, antennæ, and thorax dark fuscous. Abdomen dark fuscous, sides mixed with yellowish. Legs dark fuscous, irrorated and ringed with ochreous-whitish. Forewings elongate-triangular, hindmargin rather obliquely rounded, waved; fuscous, on posterior half purple-reddish fuscous; an irregular obscure darker edged line at one-third; a rather narrow dark fuscous median fascia, attenuated on costa, anterior edge straight, posterior edge rather projecting in middle; reniform spot obscurely indicated above this projection, sides partially blackish-margined; a paler dark-margined line at two-thirds, angulated above middle, margining median fascia on lower half; a waved paler subterminal line, sprinkled with white scales; cilia light fuscous, mixed with ochreous-whitish. Hindwings bright orange; a moderate dark fuscous hindmargined fascia: cilia fuscous, mixed with ochreous-whitish.

Duaringa, Queensland; one specimen received from Mr. G. Barnard.

RIVULA, *Gn.*

RIV. NIPHODESMA, n. sp.

Male, 19 mm. Head, palpi, and thorax light ochreous, mixed with white. Antennæ whitish-ochreous. Abdomen and legs pale ochreous. Forewings rather elongate-triangular, hindmargin rounded, rather oblique; rather deep ochreous-brown; a snow-white subcostal streak from base to apex, broadest in middle, so that lower edge appears curved; a black dot in this streak beyond middle; two short oblique white dashes from costa near apex; a slender white submarginal streak from anal angle to near apex, but not reaching it; a blackish mark at apex beneath subcostal streak, and a hindmarginal row of black dots: cilia grey-whitish, with numerous irregular rows of grey speckles. Hindwings

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ochreous-whitish; a fuscous suffusion along hindmargin; cilia ochreous-whitish.

Cairns, Queensland; one specimen received from Mr. G. Barnard.

ELAPHRISTIS, n. g.

Face with slightly-projecting scales; ocelli present; tongue developed. Antennæ in male bipectinated, apex filiform. Palpi moderately long, porrected; second joint with dense, rather projecting scales; terminal joint short, obtuse. Thorax with small posterior crest. Abdomen with small basal crest. Legs smooth. Forewings with veins 9 and 10 out of 8. Hindwings with veins 3 and 4 from a point, 5 well developed, somewhat approximated to 4 at base, 6 and 7 from a point.

Nearly allied to *Acrarmostis*, but without the peculiar neuration of that genus.

ELAPHR. ANTHRACIA, n. sp.

Male, 16 mm. Head, palpi, and thorax blackish. Antennæ and abdomen grey. Legs blackish, posterior pair grey. Forewings elongate-triangular, hindmargin bowed, rather oblique; dark slaty-fuscous, slightly sprinkled with whitish; a small crescentic blackish discal spot; a fine black irregular line from beyond middle of costa to two-thirds of inner margin, edged posteriorly with ochreous-whitish except near costa, from near costa to middle bent outwards so as to form a rectangular space round discal spot; a marginal row of large black dots; cilia dark slaty-fuscous. Hindwings and cilia light fuscous.

Brisbane, Queensland; two specimens in October.

UROSTOLIDÆ.

I find it necessary to form this new family (referable to the group of the *Geometrina*, and allied to the *Boarmiadæ*) for the following singular genus. In general characters it is related to *Drepanodes* and allied genera, but differs widely from all *Geometrina* in the structure of vein 8 of the hindwings, a character of the highest importance; this vein is here formed much as in the *Drepanidæ*, and there may possibly be some genetic affinity with that family, though not immediate. In the obsolescence of vein 5 of the hindwings the genus agrees with the *Boarmiadæ*, and differs from all other *Geometrina*.

UROSTOLA, n. g.

Face smooth; ocelli present, concealed; tongue developed. Antennæ two-thirds, in male filiform, shortly ciliated. Maxillary palpi obsolete. Labial palpi moderately long, porrected, with dense rough projecting scales, terminal joint short, nearly con-

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cealed. Thorax nearly glabrous beneath. Posterior femora in male with apical tuft of long hairs above, tibiæ somewhat dilated, containing tuft of hairs in groove. Forewings with vein 1*b* furcate at base, lower fork faint, 5 from middle of transverse vein, 6 from upper angle of cell, 7 and 8 out of 9, 9 from considerably before angle of cell; 10 out of 9, anastomosing with 11 and then with 9, 11 anastomosing with 12 before anastomosing with 10. Hindwings with frenulum developed; 1*c* absent, 5 absent, 6 and 7 widely remote, 8 anastomosing shortly with upper margin of cell near base, and closely appressed to 7 for a short distance beyond cell.

Probably a very early form of *Geometrina*, related to the ancestral form of the *Boarmiadæ*.

UROST. MAGICA, n. sp.

Male, 24-25 mm. Head and thorax fuscous, face dark reddish-fuscous, fillet whitish-ochreous. Palpi ferruginous. Antennæ pale ochreous, ringed with dark fuscous; ciliations one-third. Abdomen fuscous, sides paler. Legs dark fuscous, orange beneath, coxæ and posterior femora orange. Forewings triangular, slightly elongate, costa arched towards apex, apex nearly rectangular, hindmargin obliquely rounded, rather deeply sinuate inwards on upper half; light fuscous, tinged with ochreous and ashy-purplish, strewn with small obscure dark fuscous transverse strigulæ; costal edge orange, dotted with dark fuscous; an obscure irregular ferruginous-brown line from one-third of costa to before one-third of inner margin; a straight dark fuscous streak from two-thirds of costæ to beyond middle of inner margin, sharply marked anteriorly, suffused posteriorly; a faintly indicated irregular subterminal line, marked with a small round dark fuscous spot below middle; cilia pale ochreous-fuscous. Hindwings with hindmargin rounded, slightly bent in middle; color, strigulæ, and cilia as in forewings; a straight dark fuscous streak from middle of costa to middle of inner margin; a slightly curved series of dark fuscous dots at two-thirds; a small round dark fuscous spot towards hindmargin above middle, and another below middle. Undersurface of both wings deep orange, with numerous dark fuscous strigulæ; a median dark fuscous streak, and subterminal series of cloudy spots.

Brisbane, Queensland; Richmond River, New South Wales; two specimens.

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On a Subterranean Water-Supply for the Broken Hill Mines.

By Samuel Dixon.

[Read August 4, 1891.]

Plate X.

In laying before this Society evidences of an unlimited supply of water for the treatment of ores in the Broken Hill line of mines, I trust it may not be considered out of place to explain why such a subject should be discussed in Adelaide rather than in the colony which furnishes it. In the first place, anything which would double the population at Broken Hill must be of great importance to the colony which produces the chief food-supply for that population; secondly, because a much larger proportion of the owners of these mines are resident in this colony; and, thirdly, it must be confessed, because of the neglect which the western division of New South Wales has always received at the hands of the Sydney Government. An instance of this unintelligible neglect has been greatly impressed on me in the extreme difficulty experienced in obtaining the necessary data for this paper; and a still greater instance is to be found in the fact that the richest silver-mines in the world remain without any geological surveyor to chart down the stratigraphical discoveries of the region, which would ultimately save the community thousands of pounds in exploratory shafts and drives.

During this past summer the very greatest difficulty was experienced in obtaining water for the smelters alone, and then not an adequate supply; and the limitation of the weekly output which resulted caused a corresponding drop in capital values, amounting to £3,000,000 alone on the Proprietary stock; and, although temporary supplies have been obtained, concentration is not yet resumed, and some mines have not even attempted a concentrating plant—as, for instance, Block 10, where, as appears from last report, the proportion of ore dumped for future treatment is as 8 to 12 of the ore now smelted.

The scheme known as the Stephens Creek Water-supply is solely dependent on the rainfall, and, in view of its very uncertain and limited quantity, it appears to me that, even should it successfully impound that rainfall, the consumption of fresh water for a population at present of 25,000, and still increasing, will,

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with the requirements of the very numerous boilers and smelters, utilise all the water likely to be conserved.

Should this be the case, how is the tremendous amount of water required to concentrate the huge deposits of low grade ore to be provided? On this question depends the very existence of some of the mines, and the doubling of dividends by others; so that I ask for this paper the fullest consideration which the very great importance of the subject demands, and as it appears evident that, contrary to usual experience, the lode itself has utterly failed to supply the quantity needed, it becomes necessary to seek it elsewhere.

We know that the Cretaceous area, which supplies the magnificent artesian wells in this colony, Queensland, and New South Wales, lies far too far away from Broken Hill to be available; and with regard to the scheme for bringing water from the River Darling, not only is the distance very great, but the very intermittent supply contained therein has always seemed to me entirely prohibitory, an opinion intensified by the paper read by Mr. Russell before the Royal Society of New South Wales, November, 1886, and also by the testimony of my friend, Chas. Barritt, Esq., Mallara, River Darling, who writes me—"The river here stopped running in 1866 and 1884, but has several times been nearly stopping, but I cannot specify dates. I do not think the idea of water from the Darling is feasible, except at an enormous expense for conservation. The evaporation on large bodies of water is, roughly, six feet a year, and the Darling not to be relied upon. Twice during the last ten years have I pumped as much as was flowing in the river—once with horse-pump, with two and a-half-inch pipe, and once with steam-pump, four-inch suction. Once I had to dam the river and cut a trench to a waterhole for a supply."

Now, as to an unlimited supply. Flanking the Archæan rocks, which extend to the eastward of Broken Hill and the Barrier Ranges generally, lies a very large area of the Newer Tertiary deposits of intercalated clays and sands; this area is bounded on the north, as far as the Weniteriga Run, by the eastern extension of the Archæan rocks, and along their edge, and in a northern extension of the basin, Messrs. Riddoch have sunk several wells (see chart). Across the river, opposite Wilcannia, some sixty miles to the east, Mount Manara forms the eastern outcrop of the Archæan rocks, which gradually sink down until covered by the recent clays. The southern boundary is to be looked for at the overlapping of the Newer on the Older Tertiaries as represented by the Murray Cliffs. Professor Tate was the first to point out, in his paper on the "Basin of the Lower Murray River," read before this Society in 1884, and published in Vol.

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VII. of its Proceedings, that at Overland Corner the Newer Tertiary is a fluviatile deposit resting unconformably against the escarpment of the older formation.

In support of this is the fact that at the cliffs, on the eastern bank of the River Darling, a few miles below the Anabranch Cutting, there is exposed at low water coarse red sandstones, which, accepting Sir A. C. Ramsay's opinion, as quoted by the Professor, must have been deposited in inland isolated waters; and I think close examination of the sandstone at Tanberry Point, still further up the river, will prove it to be the same formation.

The irregularly-stratified sands and clays between these two extremes—Tanberry Point and Overland Corner, some 150 miles south-westerly—afford further fluviatile evidence, as also do the brightly-coloured clay-cliffs exposed at Lake Victoria Head-station.

For our purposes, however, we will take a line westerly from Tanberry Point towards the boundary of this province. South of this line many of the deeper wells are salt. Though shallow, fresh-water basins exist, as, for instance, at Coombo Lake, the most westerly lake filled from the Anabranch overflows, a very ample supply of water was struck at 20 feet; the water contains a good deal of magnesia, and the clays forming the bed of the lake contain a large proportion of crystallised gypsum.

I should here like to hazard the opinion that at one time—a far distant period, no doubt—the Lachlan River emptied itself into the Newer Tertiary basin under present consideration, and that the present Willandra Creek is its representative.

This Newer Tertiary basin, thus roughly defined, measures at its widest 140 miles across. Within its area, water is always to be obtained in a bed of very fine white sand, always at about the same relative depth, and, allowing for local peculiarities, of the same quality, namely, slightly saline; beneath this stratum are other water-bearing ones, as is proved by the bores in Silistria and Aldborough Wells. As to the source of these waters there can be no doubt; and to make it perfectly clear it is necessary to give a short description of the topographical features which render the Darling River so interesting a study to geologists, though the region is indeed quite as interesting to botanic students from the same cause, viz., the extraordinary alternations of flood and drought.

The watershed of the Darling extends from lat. 33½° to 25½° south, and embraces the whole western flow of water between these parallels from the high table-lands, which skirt Eastern Australia at a distance roughly estimated as averaging 200 miles from the Pacific coast. The large rivers formed in

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these mountainous table-lands run down rapidly until they reach the chief Tertiary plain of Central Australia, and there spread out in times of flood over hundreds of square miles, until reforming and gradually converging, they form, some distance above Bourke, that muddy, ugly stream, the Darling River, which flows thenceforth in a generally south-westerly direction for the remainder of its course through steep clay banks, some 40 feet high and 70 to 90 yards apart, until it junctions with the Murray; while along its course, for great distances, it is impossible to find a stone as big as a walnut. During heavy floods, which occur at very irregular intervals, it overflows its banks, and the water, with much fine mud in suspension, spreads over extensive plains, filling numerous creeks, lakes and billabongs, the only points not inundated being the peculiar red loamy sand-dunes. Between 60 and 70 miles above Wilcannia several creeks leave the river, and, flowing southerly, fill an extensive system of lakes which flank Mount Manara and the scrubby rises immediately to the south; ultimately the outflows gather into the Tallawalka, which turns abruptly west and enters the river below Menindie. Some idea of the extent of country thus inundated may be formed from the fact that the water continues to fill the most southern of these lakes three months after it has ceased to flow out of the river.

Immediately south of Menindie, a western system of overflow commences and fills Menindie, Cawndilla and Tandou lakes; and immediately below Netley Head-station the Anabranch also leaves the river on the western bank, and, after filling up an extensive lake system of its own, finally reaches the Murray 15 miles below Wentworth, where its opaque muddy stream mingles with the dark clear waters of the Murray.

As the floods subside these immense flooded areas dry-up and crack in every direction with numerous deep interstices, which, when another flood advances, serve as conduit pipes for the water to flow-down into the underlying sand stratum. Some conception may be formed of the extent to which this occurs when we find that it has been observed that for a whole week the flood has poured-down into one such crack without being able to advance further.

That these subterranean waters must total-up to something stupendous is clearly apparent when we recollect the hundreds of square miles over which storage goes on, flood after flood; and that several such basins must exist at different levels within the whole Darling basin, the varied quality of the springs oozing from the river-banks, at low water, puts beyond dispute. That some very big basins also exist between Bourke and the western slopes of the watershed appears very convincingly from Mr. Russell's paper, which I now quote:—

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"For the past ten years, upon the assumption just referred to the discharge of the Darling River (at Bourke) has been taken as a percentage of the rainfall, and the yearly amount has varied from 5·81 to 0·09 per cent., the mean for the ten years being 1·46 per cent., a startling result, and one which I believe to be without parallel in any country in the world. . . . In Europe 20 to 50 per cent. of the rain flows away in the rivers, in England about 30 per cent., and here in a river—the Murray, with similar basin and rainfall to the Darling—25 per cent. of the rain flows down the river. . . . When we go into figures to see how much it is, we get a surprising result, viz., that it is not less than ten times, and probably 16 times what the river now carries away."—*Journal of Royal Society*, N.S.W., 1889, part 1, Vol. XXIII.

I propose to deal in this paper with the western portion of the basin, as delineated roughly on the chart, which for purposes of reference, I subdivide into the Menindie basin, the Topar basin and the Cuthawarra basin. My deductions of an unlimited supply of water are based on an examination of the wells sunk within these areas. Beginning with the Menindie basin, as nearest to Broken Hill, of its southern extension it is difficult to say more than already described, but the wells Middle Camp, Eaglehawk, North Ita on the Netley Run, and Wanga on the Burta Run, are all of the same general character, 200 feet and over before reaching the drift-sand which contains the water; of these the Wanga Well is the most western within the basin. The other wells hitherto sunk on Burta have been in the southern projection of the older rocks, where they gradually sink under the more recent formation, towards the Older Tertiaries as represented by the Murray cliffs. Speaking of the Menindie basin generally we may expect to find the centre of the depression, or rather its greatest depth, somewhere about the great lakes, not only because they occupy the lowest part of the present plain, but also because of their distance from the ancient rocks. On the other hand, the two semi-detached areas, whether viewed as separate from or as extensions of the main area, are probably the shallowest; for our purposes this does not much matter, as the Menindie basin measures 140 miles across, and from the absence of any outliers of the Archæan rocks whatever (certainly no traces have yet been found), we are justified in treating it as a whole, within whose boundary unlimited supplies of subterranean water exist.

The accompanying map, which sketches in approximately the boundary of the Archæan rocks and the Tertiary basin, is compiled from the official geological map of New South Wales, published by the Department of Mines in 1877, and from

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personal information. A reference shows that the basin is widest easterly from Broken Hill, and that its nearest point to that place is on the Redan Run, and here the boundary of the two formations is evident to the most casual observer in the low ridge bisecting the run north-easterly and south-westerly, whilst northerly, towards the Quondong Well, is the most easterly of the Archæan rocks of the Barrier; hence all the wells to the west are comparatively useless, whilst all the eastern ones reach water in the characteristic fine sands. The Quondong Well just referred to, is formed by a bar of the ancient rocks intercepting the soakage of the superficial sands of Stephens Creek, hence its shallow depth (30 feet) and small supply.

The Redan Well, at the Head Station, is 270 feet to water in the drift-sand, here 50 feet thick. A bore was put down another 100 feet, and stopped in blue clay. The water did not rise above the level at which it was first struck, though at one point the hydrostatic pressure was so great that sand was blown up for 30 feet. Total depth of well and bore, 420 feet.

The Aldborough Well, lying still further towards the centre of what I have called the Menindie area, after penetrating the usual clay strata, struck water at 200 feet in a bed of sand, which proved to be six feet thick, yielding a good supply; it was then sunk through six feet of blue clay, and the water, which at first contained red mud, welled up to the level of the first flow. The well-shaft subsequently caved in.

The Kars Well was sunk many years since, it is 210 feet deep, contains a large supply of stock-water, is in fine drift-sand, and has a powerful engine, with seven-inch pipe. No attempt, by boring or otherwise, has been made, as far as I can learn, to test the presence of other water-bearing strata below.

The Silistria Well, situated towards the eastern edge of the Menindie basin, is a very remarkable one; sunk, as usual, through the various clay strata. At 270 feet water was struck in the fine sand, and a bore 131 feet deep was put down through alternate layers of blue clay and sand, each deeper layer containing coarser sand, and at the bottom very coarse sand and water-worn pebbles were found. The water, immediately it was struck, rose up to the level of the bottom of the well, and the force was so great as to send up pebbles with it. The water had a distinct sweetish taste, but is palatable for drinking; it is the deepest water so far struck within the area.

On reference to the chart, a large, almost detached, area of the Newer Tertiary to the north-west is shown, and may be called the Topar area. Particulars of wells sunk here I have not been able to obtain, except that water in fine sand was struck at the well marked towards its western edge. Its distance from Broken Hill

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is greater than the nearest portion of the Menindie area, but this basin may be worth further investigation, as the Sydney main line of railway to Broken Hill must traverse it, and so would supply fuel for engines to raise the water. This Topar basin, as charted, suggests isolation, but evidence in this direction is entirely wanting.

Another well in this area is Eckerdoon, but its precise location is not to hand. In both wells, however, the supply is reported as large, and, as far as my present information extends, of the same general character as the wells in the Menindie area.

The Cuthawarra basin is the furthest north, and is immediately south of the Archæan rocks on which Wilcannia is situated, they form the southern boundary of that Cretaceous area, which contains the valuable artesian wells of Queensland, New South Wales and this colony. The wells sunk in the recent clays of the Cuthawarra basin prove that at about 80 ft. below the present bed of the river the flood-waters are also stored up in the sand stratum. Mr. Geo. Riddoch, of Weinteriga, acting on this idea, found that as long as he was within this area he could, by using his aneroid, predict with certainty the depth at which the water would be struck. As a rule, the water is good stock-water. That it may be considered to be an isolated basin appears probable, as the geological chart shows the old rocks as closing in on each side; and that the river has cut-through between the eastern and western extension of these rocks seems proved by the existence of the Christmas Rocks some distance up river above Weinteriga Head-station, and one of the few rock-bars on the Lower Darling.

The sum of the evidences from all these wells proves incontestably that unlimited water-supplies exist at a very moderate distance from Broken Hill. I submit this is proved undoubtedly, as every well, although miles apart, has within a certain defined area invariably struck water at about the same level (allowing for the thickening of the clay-beds consequent on increased altitude), in similar strata, and of similar quality; whilst from the bore at the Silistria Well, the only one reaching the best water, which is at the lowest level, namely, 400 feet, the hydrostatic pressure was so great that pebbles were ejected with the water up to 130 feet. The Aldborough Well, as far as it went, furnished corroborative evidence, also does the Redan Well, which did not bottom to the lowest water-level. The many wells spread over so wide an area, all of striking uniformity, testify to the inexhaustible quantity of the water contained in what one may call a subterranean lake; the length of which is 140 miles as proved by the wells sunk in the eastern extension, across the Darling River. Its breadth north and south we cannot define, in the absence of exact data for the south boundary, but, taking it only as 50

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miles, we have 7,000 square miles of water-bearing beds to draw from.

To render the waters stored up in the Menindie basin available for the Broken Hill mines, there are no insuperable difficulties, and the cost need not exceed some £100,000.

The fine drift-sand of the upper water-bearing stratum has proved the cause of serious loss and a very large expenditure. It was found impossible to maintain a sufficiently deep hole to receive the well-buckets, and the attempt to do so usually ended in the well collapsing sooner or later. The pumping-engines now employed have, on the whole, answered very well, but to reach the best and the deepest water, it is only necessary to use iron caissons, double lined, as used in the erection of bridges where mud and soil must be penetrated before reaching a sound foundation.

Before fixing the actual site for the well, a preliminary survey of the natural features would be advisable to select the best pipe-track and sites for the positions of a few bores towards the centre of the basin; the bores will determine the most favourable strata for well-sinking, which could be done very quickly, as no stone or rock is to be passed through. A six-inch bore would be advisable, as the cores are certain to render valuable geological information. I should like to see a really competent consulting geologist engaged to report upon them, as it would add much to our scanty knowledge of the circumstances under which these wide-spread beds were deposited, and their relation to the period of deposition of the Murray Cliffs.

Now, as to the objection which has been raised as to the probability of the supply proving inadequate. Apart from the uppermost beds, where the water is slightly brackish, several others were passed through before reaching the gravelly beds, which contain the best water; and in the only bore which reached them, namely, that from bottom of the Silistria Well, the hydrostatic pressure was so great that the pebbles were shot up through the bore to the bottom of the well, a distance of 130 ft. This unmistakably proves the existence of a very large body of water, and, added to this evidence, we have to consider the very large area over which these Newer Tertiary beds extend, the thickness of the various water-bearing strata, as well as the supply obtained from Kars and Middle Camp Wells (although both these wells are only sunk a little distance into the first of these strata); all of which circumstances demonstrate the practically inexhaustible character of these underground waters, and more than corroborate Mr. C. S. Wilkinson's views, expressed in a private letter to me some time after this paper was first written, but before

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he was aware of its contents. The date is 25th June, 1891. "But a few miles to the south of the main road the Tertiary deposits become thicker, and form the undulating plains-country between the ranges and Menindie. In these deep deposits in places artesian water of good quality is likely to be obtained. The formations consist of the recent Tertiary, gravelly, ferruginous clays like those at Caulker's Well; then below these the Older Tertiary lacustrine lignite-beds, resting on the Older Tertiary marine beds, in which the best fresh water may be obtained; possibly some of the Cretaceous beds may underlie these. Several years ago I prepared a map for the Lands Commission, showing the probable extent of these older water-bearing formations, and advised the putting down of bores for artesian water to the N.W. of Menindie, on the Broken Hill road between the Darling and the outcrop of the slates." This very accurate forecast is completely verified by the facts above-mentioned. As to the possibility of the Cretaceous beds being found underneath the Older Tertiary, I can only say that up to the present, as far as I am aware, no evidence pointing that way has been discovered.

Annexed are two estimates of the cost of utilising the water for the mines at Broken Hill. The first is by an eminent mining engineer, and the second is by the representative of Messrs. Simpson & Co., the makers of the triple-expansion Worthington pumping-engines. Each provides for the delivery of 1,000,000 gallons per day on the mines, and the distance is taken at 26 miles, neither would exceed £100,000. And the enormous commercial advantages which are evident and may be grouped under the following heads, apply to all the mines more or less, though it seems superfluous to mention them :—

1. Concentration of the large bodies of low-grade ores will add very largely to the weekly output without increasing the cost of fuel.

2. Amalgamating kaolin ores, saving £3 to £4 per ton on some.

3. Leaching.

4. Making it possible to condense the fumes.

5. Water-jackets and boilers will last much longer.

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No. 1.

ROUGH ESTIMATE OF COST—THREE PUMPING-STATIONS.

2,100 tons 18-inch wrought-iron pipes (for 26 miles) ...	£53,200
Engines and pumps at well	4,500
Six pumps for stations (duplicates at three stations) ...	6,000
Stop, retaining, and relief valves and three feed-pumps	1,050
Boilers	3,100
Pipes and fittings to pumps	500
Erection of boilers, pumps, and buildings	3,500
Material, trenching, and laying pipes	5,000
	£76,850

Above prices f.o.b., exclusive of transportation and dams or tanks at stations.

No. 2.

APPROXIMATE ESTIMATES.

One well (400 feet deep), one vertical engine to pump into reservoir (to raise one and a-half million gallons in 24 hours from 270 feet); two horizontal triple-expansion engines (each to raise half a million gallons in 24 hours against a total head of 800 feet); four 96-h.p. boilers, traveller, feed-pump, &c.; engine and boiler-house, chimney-stack, and engine foundations; reservoir to hold 5,000,000 gallons, and all necessary valves (reservoir of stone or concrete)—for the sum of £44,500.

If a dam can be made the price above could be reduced to £28,500.

As there is abundance of clay in the country, we may take the latter estimate £28,500

Add pipes from first estimate	53,200
Laying pipes and material	5,000
	£86,700

Add to this freight for pipes to Port, and railway charges, and delivery on the ground, and railway and delivery charges for engines and pumps.

Consumption of coal six to seven tons per day.

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THE ABORIGINES OF THE UPPER AND MIDDLE FINKE RIVER: THEIR HABITS AND CUSTOMS, WITH INTRODUCTORY NOTES ON THE PHYSICAL AND NATURAL-HISTORY FEATURES OF THE COUNTRY.

By Rev. LOUIS SCHULZE, Missionary.

(Communicated by the Honorary Secretary.)

TRANSLATED FROM THE GERMAN MANUSCRIPT BY J. G. O. TEPPER.

[Read April 7, 1891.]

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I. THE COUNTRY.

1. PHYSICAL FEATURES AND SOIL.

The basin of the upper and middle River Finke is situated between the 23° and 25° S. lat. and 132°-134° E. long. It is an undulating plateau, gradually rising from north to south, and crossed by two main ridge-like ranges. There are several minor ones as well as isolated mountains, as, for example, the Waterhouse Ranges in the east, the Gosse Ranges in the west, &c., but which are virtually offshoots of the main chains. The northern range, called *Merena* by the natives, is the more lofty, its highest peak being said to be 3,800 feet above sea-level. At a distance, when viewed from the south, it presents a majestic appearance, but on a nearer approach this impression vanishes, owing to the gradual elevation of the intervening country. This range forms

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the watershed of the interior of Australia, the streams flowing north on one side and south on the other. The River Finke, with a mainly south-easterly course, together with its tributaries—namely, Rudall-Creek, Ellery-Creek, the Hugh, the Todd, &c.—take their rise here, but not from springs. Though there are a few springs in this range as well as in the southern chain, they do not produce an overflow, but form swamps or ponds. Even when in winter the water does commence to run, the stream, after a course of a few hundred yards, is absorbed in the sand. It requires heavy continuous rain to produce a steady flow. Dry sandy water-courses are the prevailing characteristics, studded with Eucalypts or shrubs. The waterholes after a flood offer a welcome change, but these in time gradually dwindle and disappear during long-prevailing droughts. At these localities, however, water may be obtained by digging. The tall Eucalypts furnish the clearest indication of a water-course, both as to its channel and overflow; for this latter may be up to half a mile wide, or over a mile at some places, and is always overgrown with these trees. They are generally at a distance from one another, but in a few places form a close forest.

The southern chain, or Krichauff Range, here usually called the James Range, and by the natives *Ulamba*, is much broken in some localities, like the northern one, the highest point rising to a height of about 1,500 feet. It is crossed by the Finke River and several of its tributaries descending from the MacDonnell Ranges to the northward. Its own waters run into the Finke River in larger and smaller river-beds. The largest of these is the Palmer, with its tributaries descending on the southern flank with a south-easterly direction. On the largest of the latter, the Walker, a few miles above its junction, is situated the cattle station Tempe Downs. Where the Finke River enters the range is the Mission station—Herrmannsburg. Some 40 miles east, at the entrance of the Hugh River into the Waterhouse Range, is the Owen Springs Station, and in the eastern part of the MacDonnell Ranges, on the River Todd, are the well-known Alice Springs.

The scenery in the MacDonnell, as well as the Krichauff Ranges, is at some places most striking and picturesque. The finest of these is along the course of the Palmer River in the Krichauff Range, about 10 miles from the mission station, Herrmannsburg, where there are hundreds of Fan-palms, whose slender stems, a foot in diameter, rising straight and tall, bear aloft a beautiful, globular crown of leaves, some 30 feet in diameter. Within both Ranges are plains, overgrown with bushes like those of the elevations and outer plains around. After heavy rains good grass grows in places, but most of it is

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covered with Porcupine Grass, *Triodia irritans*, or other species, which is feared by all creatures. In places the Porcupine Grass extends for miles, resembling in appearance a waving field of corn. The soil is chiefly a red-colored loose sand, blown into hills and even chains of hills, between which extend plains of dark-grey loamy soil. Extensive limestone rises are also seen. The soil is passable, but the rainfall is too scanty. After rain herbage grows upon the red sand and the limestone hills, wherever the Porcupine Grass will allow it. The plains, however, are the most fertile.

2. Climate.

A clear sky, bright sunshine, very great heat, and long-continued droughts usually prevail. The idea of the four seasons in equal proportions is scarcely applicable here, for both spring and autumn may be very hot. The hottest months are December, January, and February, the last two being the worst, as the heat then continues day and night with hardly any intermission for two or three weeks. The temperature rises usually to 112 deg. F. in the shade of our reed-thatched verandah, exceptionally even to 115 deg. F., and sinks often scarcely below 90 deg. F. in the morning. After sunrise it again rises rapidly, and is frequently above 100 deg. F. at 9 a.m., and the same at sunset. In the spring months, viz., October and November, the heat is often as high as 110 deg. F., but lasts only three days, being produced by the north-west winds. The pleasant south-east wind then prevails for several days until again overpowered by the former. The north-westerly wind usually fills the air with dense clouds of dust, making things invisible at a hundred yards distance. The south-easterly wind acts frequently in the same way, but minus the excessive heat. In April and May the same winds prevail, but are not as strong.

The pleasantest months are May, June, July and August, which may be termed the winter months. If it begins to be chilly in May, the two last months are usually mild and warm, but if the cold sets in during July, this month and August are the coldest. The thermometer sinks then at night to a few degrees below 30 deg. F., as low as 20 deg. F. occurs rarely. The thin ice formed at night begins to melt soon after sunrise, but remains frequently till noon in shady places. The south-east wind is often raw and disagreeable at this period, even by day. Snow is not known to have occurred here, but hoar-frost is sometimes observed in calm weather. Excessive perspiration day and night during the long-continued heat renders the body weak and sensitive, so that the cool or cold weather is felt very severely. Catarrh prevails at this season, although it is the time for recoup-

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ing the exhausted system enervated by heat. The natives also divide the time into four seasons, not according to months, but simply as regards the temperature prevailing. The cold period they call *lurba* and *lurbaka*; the next following *mballagata*; the hottest season is termed *mballaka* and *albolbuka*, and the succeeding one *lurbagata*. Rain is the rarest phenomenon, not pertaining to any particular season. The usual signs are illusionary, or frequently it seems as if a downpour was about to take place, but a few drops may only fall, most of the turmoil consisting of wind and dust accompanied with flaming flashes of lightning and crashing thunder-claps. During the 14 years of our residence here, soaking rain, causing the water to flow, and also droughts have occurred in each season, but the summer months are mostly the wet months. There have been also summers without any, not counting passing showers, which are of little use in this country; they neither add to the water supply, nor produce feed, simply cooling the air for a few days. Rains from the south lower the temperature, being followed by cool south-east winds for some time. These, in winter, are certainly often disagreeable. Only the heavy showers during the warm and hottest seasons produce any growth of grass, especially, if followed by lesser showers at comparatively short intervals. Without these latter, the growth of grass remains poor and scanty, and occurrs only in protected localities. Should the rains fall during the months of April, May, June and July, as, for example, in the year 1889, nothing will grow after them, however copious they may have been. Rain scarcely ever occurs but as showers during thunderstorms.

The duration of the flow of the water in the river-beds depends upon the magnitude and duration, and quick succession of the floods; a single flooding soon passes off, notably in the middle of summer, whilst another soon following, the flow is more continuous, especially in winter. The longer the drought lasts, the salter and more bitter becomes the water in the waterholes of the River Finke. While the water of our wells remained fairly good for many years, it became quite bitter and undrinkable after the winter-floods in 1889. It was also useless for watering the gardens, so that few plants remained alive, and even moderately large almond-trees succumbed.

Whirlwinds are common. At the change of the wind many, and some even of colossal magnitude, may be seen rising high-aloft, whirling upwards all loose grass and brush together that is encountered in their path. On the other hand, mirage is a rare phenomenon, visible only at a few localities, and not nearly as marked as further south upon the large saltbush plains about Farina, Hergott, &c.

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3. Natural Products.

a. MINERALS.

How rich or poor in minerals this region may be the near future will show. For several years past they have been eagerly searched for, especially in the MacDonnell Ranges, and thousands of pounds have been spent in this pursuit. The Krichauff Range does not appear to contain anything but red sandstone and iron-ore. In the eastern part of the MacDonnell Ranges there are already a large number of gold-diggers, and some fine nuggets are said to have been picked up. A few years ago there was much excitement about the discovery of rubies, but they proved to be garnets. At present the mica of this region engages the attention of prospectors on account of the large size of the plates procurable.

b. PLANTS.

In consequence of the scanty rainfall and the ever-recurring continued droughts the vegetation is meagre, but after copious rains the display of flowers of the herbs and shrubs is magnificent. It is only a pity that it occurs so seldom. There is a large variety of plants, but few of great size or luxurious aspect, and only a few trees. The most common of these latter is Red-gum (*Eucalyptus rostrata*), growing in the river-beds, where it attains all sizes up to a hundred feet high, and six feet in diameter, but giving little shade on account of the sparse foliage. Many of them are crooked or hollow, but some are straight and sound. Their timber is more or less durable, according to age and position. A less common tree is the Beefwood (*Grevillea striata*), which occurs either singly or in small groups. It may attain a size of fifty or sixty feet in height and two feet in diameter. The bark is rough, with immense cracks, mostly black; the leaves are a quarter of an inch broad by a foot long; the wood resembles beef in aspect, hence its name—*beefwood*. The majority are sound and healthy. The Desert Oak (*Casuarina Decaisneana*) has mostly a slender, straight stem about twenty feet high and one and a half feet in diameter; the bark is rough and cracked; the branches, with their cord-like twigs some ten inches long, form generally a pretty round top, but do not afford much shade. The main or tap-root appears to descend as deep into the ground as the tree ascends above it—at least, this is the case with the small trees. It grows either singly or in groups, and forms occasionally forests on the sandhills in a few localities. The wood is white outside and brown within; it splits easily, and while fresh is easily worked, but when dry becomes very hard. In water it lasts better than *Eucalyptus rostrata*. With it all the wells have been timbered, and it was found very suitable for

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beams. The Pine (*Callitris verrucosa*) grows here and there in the ranges, and remains low and small, on which account it is unsuitable for timber. The Fan-palm (*Livistonia Mariæ*) only occurs in the Krichauff Range, and at one locality some eight to ten square miles in extent, where it grows in the beds of the Finke River and some smaller water-courses coming from the north-west. It overtops all other trees. The wood is stringy, like straws compacted lengthwise, and is very light when dry. The fruits are of the size and form of bullets, and as hard as stone. Most of the interior consists of endocarp, covered with a thin skin. They form an immense grape-like cluster, which springs from between the leaf-stalks, and hangs down like a mistletoe. The leaves consist of a flat stalk ten to twelve feet long and some two inches wide, with short spines on both sides, and bearing at its extremity a fan of leaflets some five to six feet long. The Grass-tree (*Xanthorrhœa*) grows at a few places on the sandhills, its trunk attaining a height of about six feet and a diameter of one foot. The cord-like but quadrangular leaves of about three feet in length grow from the summit and hang down like long hair, a cylindrical fruiting-scape rising from their midst to about seven feet and about one inch thick. The bristly head of leaves, with the solitary black scape rising above it, give to these trees a weird, fairy-like aspect in the midst of fields of the forbidding Porcupine-grass, especially when seen for the first time at night. All other ligneous plants growing on the sandhills, plains, water-courses, or in the ranges form only low or moderately-tall shrubs, with the exception of the Mulga (*Acacia aneura*), which attains to the size of small trees. At some places the thickets formed by the shrubs are so dense that they can scarcely be penetrated. Formerly bush-fires occurred frequently, but since the introduced stock has fed off the grass they have become less prevalent. Of fruit-bearing trees and shrubs there are none according to European ideas or taste, but many from the native point of view. All these fruits have either too much of the stone and scarcely any fleshy part, or else possess a too-acrid or acidulous taste. Of cultivated plants, figs grow fairly well; all others will not flourish. The Date-palms also grow very well, but how they will fruit time alone will tell. Various culinary vegetables thrive indifferently, but cauliflower excellently. The reason for the ill-success of the gardening efforts is to be sought for more in the bad water of the Finke River than in the climate. After rain many plants grow well, even during the hot season.

c. ANIMALS.

All domestic animals, such as horses, cattle, sheep, goats, pigs, dogs, fowls, &c., have been introduced by Europeans, and do very

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well. During the long-continued droughts many of them die through want of feed. The dryness, and consequent poverty of the country, is also evidenced by the indigenous fauna. There are no large representations of it besides Kangaroos and Emus. Of marsupials, the largest is the Kangaroo, called *Arira* by the natives; the second in size is the Uro, with the native name *Aringa;* the third is the Rock Wallaby, or *Aroa* of the aborigines. Besides these there are others known by the following native names:—*Inmora, Kwalba, Iwuta, Kweba, Tnunka, Putaia, Mota, Antina* (the common Opossum), *Tjilba, Gurra* (probably the Long-nosed Pouched Badger, *Parameles nasuta), Tatja, Ruartja, Tokia* (certainly the Garden Dormouse, *Myoxus nitella), Lukura, Inalinga* (the Ant-eater). There is besides the marsupials the Native Jackal, commonly called "Wild Dog," but by the natives *Knulja;* and a kind of cat, termed *Lukaringa* by them.

Of reptiles, the Lizards and Snakes are represented in fairly large numbers. The natives have names for at least nine different kinds of lizards, of which the largest, *Tjunba,* is about eight feet long, and 22 inches wide from one foot to the other. The others are called *Loatjira, Ntjira, Baliaka, Irbanta, Takinjara, Rena, Ngenäurbarana, Ntarita.* Snakes, called *Apma* by the natives, exist here in great numbers, of various colors, and of considerable sizes, up to the thickness of an arm and a length of eight or nine feet. The natives have names for 22 kinds, viz., *Laltacalbula, Ilumpalatnina, Lanjarariintunana, Njuritja, Kapiltaringa, Menkaltarina, Latuara, Renina, Ulpopana, Warankula, Ilparalea, Lalpalanana, Erulangalanana, Baraloatjira, Gulaia, Gnaringa, Rata, Ilbaraba, Rumburunga, Putamanina, Erakurkargina, Ntadirka.* Most of these are venomous.

The voice of frogs is heard very rarely, still more rarely are they to be seen. They live in the sand, and only appear above ground after rain, and then exclusively at night. Their voice resembles more the bleating of a sheep than the croaking of European frogs, and many new-comers are deceived by it.

The fishes are called *Irbunga* by the natives, who name nine different kinds, viz., *Antabikua* (as large as a herring), *Longulbara, Ntamantana, Arumunta, Babababa, Renginga, Ltemba, Raltaralta, Kwalbila,* and *Ltjauma,* the last being really crayfish, but which they do not eat.

Birds of great variety, of all sizes and colors, are to be met with here, especially after continued rain and subsequent floods. The largest bird is the Emu, called *Ilia* by the natives. There are also some wild Turkeys, which the natives call *Itoa,* and a few Pheasants, for which the native name is *Ngamara,* While the Emus and Turkeys lay their eggs upon the ground, the

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Pheasants place theirs deep in the sand, for which purpose a hole is scratched out and two eggs deposited, and covered over; a little distance away it does the same, and so forth until finished, the sun effecting the hatching. The young ones appear in pairs above ground, and at once commence to search for their food. The Emu hen gets her eggs also hatched by the sun, but she takes a good deal of care of them, and when hatched takes the young under her protection, and they follow her about. The Turkey acts in the same manner, but appears only to lay one egg; the young one she takes about with her by carrying it upon her back. The food of the Turkey is gum secreted by various trees and shrubs, and caterpillars of the nest-building kinds; the Pheasants eat snakes, &c. Pigeons of various sizes occur almost everywhere; and the red-legged Water-Hen is also found here and there, besides Ducks, Pelicans, Spoonbill-Geese, Snipes, &c. Black and white Cockatoos are not wanting either, and fill the air with their discordant cries. Most plentiful of all are, perhaps, the various parrot and sparrow-like birds. For all of these the natives have names, amounting to about 43 kinds in all, among which are several Hawks. Nor must we forget the Crow, which can endure frost and heat. There are also a considerable number of night-birds, such as Owls.

Caterpillars of various kinds sometimes infest the country, especially after rain. A peculiar kind, called *Weba*, is a favorite article of diet with the natives. There are also various species of beetles and other insects. One species is a favorite food of the natives, who call it *Alknenera*. Wherever *Eucalyptus rostrata* occurs, the latter (a species of cicada) come out of the ground, have leathery wings, and are larger than cockchafers. The males have a sort of drum on each side, connected by a channel across the underside, the whole being covered by a valve, through the opening of which they produce a continuous, shrilly vibrating noise.

The flies here are very bold and importunate, like angry bees, and can scarcely be kept off, especially attacking the eyes.

The mosquitoes are also sometimes a great nuisance; and spiders, centipedes, scorpions, ants, &c., abound, but their venom does not appear to act fatally, although causing great pain.

II. THE ABORIGINES.

1. Physique and Diseases.

There is probably scarcely a country where the aborigines are so few in number as in Central Australia. Sometimes one may travel for days without meeting a single one. During our resi-

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dence here they have become considerably reduced in number. The causes are various, as for example, the incessant murders for the sake of revenge, few births, and being shot down. Of the last, several cases came to our knowledge in years gone by, and we have also been told by white people, and especially by the natives themselves. Latterly nothing of the kind has occurred.

Their hair is not woolly, like that of Negroes, but straight; in a few cases the ends are slightly curled; it is dark-colored, and but rarely fair. In a state of nature it hangs down uncombed and confusedly, hence their repulsive appearance. Usually they tie it up into a top-knot with string made of the hair of rats, so that it forms a sort of a short thick queue. Being anointed with grease, covered with dust, and unkempt, their hair gets matted into ball-like masses. A few have fine beards and whiskers, but the latter is generally the best developed. As though under some solemn vow, they will allow no razor to touch their beards. The moustache is cut, but formerly, whilst this was being done, they held fast their hair and beard with both hands. The mouth is wide, the jaws somewhat prominent, but not the chin; the lips are certainly thick, but not nearly so protruding as those of the Negroes; the forehead rather recedes backwards; the upper part of the nose is depressed, causing the lower forehead to project, whilst the tip is broad and thick, and the round nostrils are widely separated. The cheek-bones are prominent, and the eyes are sunken, the white parts being dull and of a bluish tinge. The body on the whole is slender and well built, although there are a few who are stout and broad.

Blind and half-blind persons are numerous, caused by eye-diseases, which prevail at the change of the season after the great heat. The halt, and the deaf and the dumb, are also to be found. A kind of climatic fever prevails usually at the end of the summer, which prostrates one after another. The scars on the faces of some afford evidence that smallpox affected them some 16 or 18 years ago. They call the disease "*Pania.*" Some are said to have died of it. Little children are often subject to diseases of the throat, which prove occasionally fatal. The worst disease among the natives is syphilis, with which everyone is more or less tainted. From the first we have had to treat this disease, and several of the natives have died of it. The disease appears to be becoming more prevalent, due probably to general prostitution. Owing to this disease few children are either born or are then so delicate, that when grown up they have not the stamina of the white inhabitants, though the latter are exotics to the climate. There is certainly no great future for this people.

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2. Mental Capacity.

The mental capacity of these aborigines is not in any way equal to their physical development. Indolence and laziness are their greatest faults, and the cause of many others. This is due partly to the poverty of their country, which, by causing tillage of the soil to be an impossibility, forces the natives to depend upon the wild and precarious life of the chase. Rightly a German proverb says, "Fishing and bird-catching spoil many a fine youth." Such hunting and rambling about in the bush kills all mental activity, and lowers man to the level of the beasts. These aborigines have mental capacities, but they are lying dormant. It is only necessary to develop these, and to show them the use and advantage of so doing, but, unfortunately, there is nothing on which they can exercise their talents. What advantage can it be for a youth to learn if he has no prospect of obtaining a position corresponding to his attainments? No, he must remain as he was! Must not this produce indifference? One finds, therefore, their talents weakly developed because unused throughout their life. To reflection they are quite unaccustomed. To train them to reflect, or to habituate them to think, requires a great deal of trouble. This we have especially experienced in our linguistic labors and in the literary work now in hand. The concrete is comparatively easy to them, but as soon as the abstract is touched upon it is impossible to keep their attention even with the greatest patience and effort, for they deviate in all directions. Asked for the reasons of their social and religious customs, their final reply is "*Wara*"—*i.e.*, "Our habit; nothing else." To such habit their whole rites have been degraded, so that they themselves do not know rightly why they do it, and are incapable of explaining. This is also the reason of the difficulty of discovering their motives, and caused the investigation of their social regulation in respect of their Eight-class system to be so troublesome. Information can only be obtained by accumulating many examples from their actual life, and then directing their attention to them. For such mental work they have no inclination, and would much rather do some hard bodily work. They take the greatest pleasure in riding horses. It is rather difficult for them to comprehend arithmetic, yet we have advanced several scholars so far that they can do the four rules of arithmetic without error, an indication that they are capable of some mental culture.

In their own language they can count to four only, viz., One, *ninta;* two, *tera;* three, *tera ma ninta;* four, *tera ma tera.* After these they have *urbutja*, some; *njara* and *knira*, many; and finally, *kniranjara* or *hyaraknira*, very many. The number of their own fingers they cannot count accurately, and they have quite a different idea of numbers and things to ourselves. If

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they have seen 10 emus, for example, or 15 or 20 strangers approaching, they say in either case "*njara knira bitjiririma*," "very many are coming." This is quite natural under the circumstances. Many contradictory elements are found in their religious views and habits. It never occurs to them to reflect about this. If their attention is directed to them, they smile complacently, and continue to adhere tenaciously to that which is customary. In their domestic affairs their want of reflection is also exhibited. The saying "Take not thought for the morrow, &c.," is unnecessary advice to give them. At times grain is plentiful, but to store any for the future never enters their minds, or that a bad season will follow a good one. Similarly the idea of a life after death gives them no trouble, owing to the abeyance of their reflective faculties. Many a time we have warned them not to kill cattle, and yet they could not resist the temptation, ignoring the consequences. Many a time have we also warned them against the murders for revenge, and showed them that ultimately they must fall themselves as victims, but with a similar result. The word of God alone can produce a change here, as we have with some, who placed themselves under its rule; no external culture can do it. Therefore more mission-stations should be founded, and the native induced to reside there; that alone can save them bodily and spiritually. Hours, even days, they can sit stolidly in the shade of a tree, or lie there, without getting tired, humming at times to themselves. To explain spiritual matters to them is not easy, especially as there are not words to express the ideas, and will have to be coined for the purpose. To learn the meaning of these they find exceedingly difficult, and only a few can master it with effort. Their memory is good, and exceeds that of many white people. They are quick at learning by rote, and retain anything they have heard, learnt, or experienced. For music and singing they have a good ear, and they easily pick up a tune. Some have also good voices, and use them, but others are too lazy to exert themselves to sing. Their aboriginal songs are very monotonous and monosyllabic. To learn and sing them requires neither trouble nor application. Perhaps this explains their liking for extending their singing performances till late into the night; even children thus sing at their games. Usually they beat time to it with their hands, or slapping their bare legs, or with their *tnuma* (short stick) upon a trough. The tone moves from quinte to quinte monotonously. If, for example, they have repeated the stanza several times in the high *d*, they sing it again several times in *g*, after this in low *c*, and then begin again at the high note, and so *ad libitum*. The whole stanza consists of three to five words, which are endlessly repeated until they change it for another to the same tune. The burden of

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these stanzas or verses is either a prayer to save them from some disease, as "*Antaba tarta potinga!*" *i.e.*, "Headache quiet become!" or, "*Aralba pananaia!*" *i.e.*, "Dry up smallpox!" or a prayer for "*tjurunga*," or food substance, or some such object. Popular songs they have none, for the simple reason that they are deficient in popular sentiment; nor heroic songs, because there are no heroes among them. Their perception is, like that of all children of nature, of no mean order. To describe an object according to its external form, color, and properties is easy for them, and they can mimic speech, actions, and other peculiarity. Their *tjurunga*, corroborees, are mostly animal-*tjurunga* (feasts?); thus at an Emu-*tjurunga* they imitate exactly an Emu in all its movements. The paintings of their bodies also represent mostly animals, such as snakes, frogs, &c. Although only able to count up to four, they can individualise large herds of cattle or horses, and can tell at once if one is missing, and which, and what its color or appearance may be. In tracking they are great experts, perhaps equalled by few. They can tell fairly well how old the track is; and distinguish that of every man and animal from that of others. Where nothing is apparent to us they follow without hesitation. The imagination is largely developed. Not only by night do they fancy they see and hear all sorts of things and sounds, but even by day—the offspring of fear. Thus they tell of nocturnal spies, which one or the other fancies to have seen or heard. If requested to show the tracks, they say that these walk without touching the ground. They will even name those they fancy to have perceived. It has happened several times in broad daylight that they have come to report that yonder were *tnenka—i.e.*, enemies! These proved to be either animals or only bushes. They can make fanciful comparisons, as, for example, the names given to several heavenly constellations. The Southern Cross they call "*Eritjinka*"—*i.e.*, eagle or hawk's claw. The Milky Way they term "*Ulbaia*"—*i.e.*, water-course. The sun is for them a woman with a great firestick; when she puts on much wood the fire blazes up tremendously, and begets the excessive summer heat. In the evening the sun-woman passes under the arm of an old woman, and becomes invisible. Her nourishment consists of grubs feeding in timber. The moon is an unsexed male, and called "*Atua*." As the new moon, or young man, they view it rejoicingly, and call each other's attention to its appearance. He feeds on opossums, which causes him to get so round and full. Then he gets old, becomes attenuated, and disappears in the ground. The stars are distant fires.

3. Character.

The natives are deficient in courage, and commit their revenge —murders only—by stratagem, waiting and spying till they can

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surprise their enemy alone at night. They are afraid to engage in open combat, or if they do, they must feel themselves superior in strength. The most innocent sounds may be productive of fear and trembling, through their imagination. They are easily roused to great anger, when they will scold and abuse each other for days, or even beat and wound with spears, but the latter only by piercing into the thick muscles of the thighs. To prevent such a quarrel ending fatally, the rest interfere, when necessary, armed with their spears. At other times they will sit comfortably together and tell tales. They consider the aged, sick, and infirm members to a certain extent, and supply them with food and drink if not requiring too careful and tender treatment; but otherwise they may precipitate the end by their inconsiderate action during outbursts of sorrow and grief.

They can also take pleasure in being extremely cruel. They may beat some at times to death. Their enemies they spear in places where the wound is not speedily fatal, break off the shaft, and push the barbed end still deeper into the body; they then scorch the wound and adjacent parts with a firestick, to induce people to think the person had been killed by falling into the fire. They can also be tender and kind, carrying wounded comrades, &c., carefully in their arms or on their backs.

The natives are also hospitable. When visitors arrive in camp they give whatever they have. Everything conducive to sociability and amusement they cultivate and practice as much as they are able. They do not care to be much alone, but sit together for hours and days, chattering about nothing in particular, or lewdly, even in the presence of children, without a thought or a care. They are fond of numerous visitors, and of returning their visits.

Courtesy is not unknown among them. They salute each other by striking the thigh several times with the palm of the hand. When strangers pay a visit they do not enter the "*tmaruna*," camp, at once, but sit down at some distance and wait till someone comes and takes them in; if there be no man at home, the oldest woman performs the ceremony. If a larger number arrive in company, the whole "*tmara*," camp, becomes agitated. In solemn procession they go to meet them, with their weapons in their hands, approaching in serpentine curves, and performing all sorts of bodily motions, while the visitors stand still, the spears placed before them, the point directed upwards. After saluting each other they sit down and chat.

In regard to living, the natives are quite thoughtless, never heeding the future. If they have something to eat, they feed until it is finished. Some can devour three-fourths of a sheep at

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a sitting, and drink in proportion. On the other hand, they can fast for a considerable time, and only when hunger compels will they leave the camp for a fresh supply, and if they cannot get anything else, are satisfied with the toughest roots.

They are heedless, and cannot be depended upon. If not constantly supervised something is sure to be done wrongly, left behind, lost, or wasted. If scolded they laugh, and do not understand the value of time or things; if their huts burn down they make merry over it.

The laziness of the natives is great. To get them to work is difficult; and still more to keep them at it. Directly one's back is turned they either sit or lie down, or disappear altogether. They consider it a great favor to give the smallest aid. To beg they are not ashamed, but annoyed if they do not get what they want, calling the person a miser.

Lying, cheating, envy, bearing illwill, having ambition, and being conceited, are by no means unknown emotions amongst them, but they lack generosity and nobility of mind. Their rule is, "Eye for eye," &c., and if one only employs a chiding word, or gently strikes the unmannerly child of another, it is resented at once, and paid back with interest.

The natives respect an oath or solemn promise. They have a certain idea of adorning themselves, but their tastes differ from ours. To beautify themselves they rub their bodies with grease to make the skin shine, and try to ornament it by painting, and the application of tufts and cords. Nor do they take equally to all, hence arise connubial quarrels.

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4. Social Life.

a. THE EIGHT-CLASS SYSTEM.

The social as well as the family life of this people is largely governed by a system of eight castes (classes), which forms the basis of all degrees of relationship among them, and they, therefore, adhere with great tenacity to it. That there should be any deviation or change in this is quite incomprehensible to them, as that would force them out of the old routine into a new and strange course, which is entirely beyond their horizon. All the eight classes are co-ordinated among each other, neither more nor less privilege appertaining to any. With respect of marriage, this is always between a prescribed pair, thus forming four pairs of classes by prescription, although eight by name. The following synopsis shows which classes may intermarry, and to what class the children of the four pairs belong:—

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Males.		Females.		Children.
Beltara	...	Gomara	...	Bunanka
Pungata	...	Mbutjana	...	Knuraia
Gomara	...	Beltara	...	Purula
Mbutjana	...	Pungata	...	Ngala
Bunanka	...	Purula	...	Beltara
Knuraia	...	Ngala	...	Pungata
Purula	...	Bunanka	...	Gomara
Ngala	...	Knuraia	...	Mbutjana

The rule is that those who stand on the same line marry first, but under certain circumstances marriages in a diagonal line are permitted to take place, for example, a *Beltara* may marry a *Mbutjana*, and a *Pungata* a *Gomara*. But whether the *Beltara* has a *Gomara* or a *Mbutjana* for his wife is immaterial to the classification of the children, who are *Bunanka* according to paternal descent. The same rule applies to the other classes. That two classes have the right of intermarriage, I think may be accounted for in the following way, viz., that formerly this people had been more numerous, when class intermarriage was not allowed. But when subsequently it became much reduced in number, one class may have contained only a few men, and the other a few women, they then resorted to this relaxation of the rule to avoid extinction, and permitted intermarriage between two definite classes. At present their numbers are so reduced that, even with this, marriages can scarcely take place within the prescribed limit, especially as many white people attach to themselves native women. Polygamy makes wives still scarcer, as some men acquire two or three. A bachelor has, therefore, to wait until he is lucky enough to get a wife, *i.e.*, until some *rendera* or *gamena* gives him his daughter. The *gamena* can only do this when the aspirant is not the brother of his mother. For if his mother is not from the direct line, but the indirect one, he calls her brothers also *gamena*, and may not marry her daughters.

Among Christians the family is formed by the various degrees of consanguinity; among these natives it is constructed on the class system. The family is supported by it, or rather born out of it; for a youth has not the right to choose a bride for himself, but must take the one selected for him by some *rendera* or *gamena*, as stated above. He makes no demur at this. Such a marriage only gives rise to a few new degrees of relationship. Neither the man nor the woman assume any new title, the connubial relationship being only indicated by affixing the word *iltja* to the names, while the affinity of the class is denoted by the affix *lirra*. Thus *noa* means spouse or partner; *noa iltja*, real spouse, with whom he cohabits. Again, *kata* signifies the father of the class; *kata iltja*, sexual father. Ordinarily they leave out

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the words *iltja* and *lirra*, and do not use them, because they all know among themselves who is personally related, and who is not. They are only used casually when conversing with strangers, to whom they wish to explain their family relationships. For the slightest difference in affinity the natives have distinctive names, which are also employed in the family. Thus all persons belonging to the same class (even if they, according to our ideas, have no consanguinity) call themselves *arumbinjara* and *itiinjara*, which means something like brothers and sisters. The younger one says *arumbinjara*, the elder *itiinjara*. If only two be present, the younger says *arumbananga*, "we both (are) brothers (sisters);" the elder *itiananga*, which means the same. The elder brother and sister call the younger brother and sister *itia*, while the younger brother and sister call the elder brother *kalja*, and the elder sister *kwaia;* besides this the younger brother calls the elder sister *arumba*, and the younger sister the elder *nkura*. The younger brother says, therefore, "*kananga*," (we are) two brothers, or "*kananganganga*," we (are) brothers; the elder says "*itiananga*," (we are) two brothers; or "*itiinjara*," (we are) brothers. Similarly the elder sister expresses herself in respect of the younger sister or sisters, but the younger one, on the contrary, says "*nkurananga*," or "*kwaiananga*," we two (are) sisters; or "*nkurinjara*," or "*kwaiinjara*," we (are) sisters. These examples will show how they indicate by separate names certain differences, which we cannot in our language without employing several explanatory words. Accordingly, their relationships are very complicated, so that even the cleverest among them are often unable to find the right answer. Only by instances from their own life can this be rightly inferred, and one must be, therefore, quite accurately informed before one can determine their family relationship.

In the following synopsis a *Bunanka* man and woman is taken as an example of the nomenclature of all the classes. The same terms are used by the other classes, but, of course, in their proper application, as will appear from the table:—

Bunanka-men call the

BUNANKA-men: the elder, *kalja;* the younger *itia;* the very old, *arenga* and *katatama;* and these the same, *arenga* and *katatama.*

Women: the elder, *kwaia* and *arumba;* the younger, *itia;* the very old, *lora* and *lorebmana;* and these the same, *ebmana* and *arenga.*

KNURAIA-men: the elder, *ebmana* and *kaljebmana;* the younger, *ebmana;* the very old, *arenga* and *katatama.*

Women: the elder, *kwaiebmana;* the younger, *ebmana;*

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the very old, *ebmana* and *lorebmana;* these the same, *ebmana.*

PURULA-men: each other, *mbana;* when father's sisters' children, *i.e.*, if their father be a *gomara*—each other, *ankalla, kalja* or *itia;* when a *Mbutjana*—*tjimia;* the very old call each other *katatama.*

Women: each other, *noa;* the very old, *lora* and *lora-balla;* these the very young, *katatama.*

NGALA-men: each other, *mbana;* when children of the father's sister, and he a *gomara*—*ankalla;* if a *Mbutjana*—*tjimia;* the very old, *katatama,* and these the young by the same name.

Women: each other, *noa.*

GOMARA men: *gamena;* and he the others, *amba;* also the father-in-law, *gamena;* the son-in-law, *kniritjaknatja.*

Women: *maia,* these the other, *katja, amba;* the son's wife and sisters—*nomara.*

MBUTJANA-men: *rendera;* these the others, *gamena;* also the father-in-law and his brothers, *rendera;* the son-in-law and his brothers, *amba.*

Women: *kwaimba;* these the other, *gamena.*

BELTARA-men: *kata, kniritja;* these the other, *katjia, lirra.*

Women: *wunjinga;* these the other, *katjia, lirra;* the mother and sister of the wife, *mahra.*

PUNGATA-men: *kata, kniritja;* these the other, *katjia, lirra.*

Women: *wunjinga;* these the other, *lirra, katjia.*

Bunanka-women call the

BUNANKA-women: the elder, *kwaia;* the younger, *itia.*

Men: the elder, *kalja;* the younger, *itia;* very old ones, *katatama;* these them in return, *arenga.*

KNURAIA-women: the elder, *kwaia;* the younger, *itia.*

Men: the elder, *ebmana;* these them also, *ebmana* (therefore mutually).

PURULA-women: *kwaitjala,* and these them similarly; the very old, *lora* (mutually).

Men: *noa,* and these similarly in return; the children of the father's sister in direct line, *ankalla,* in indirect one, *tjimia* (also when the father of the mother).

NGALA-women: *kwaitjala,* these similarly in return.

Men: *noa;* these similarly in return.

GOMARA-women: *maia,* these the others, *amba.*

Men: *gamena,* these the others, *amba;* if the husband's father and brothers, or the brothers of the mother—*mbatjinga* and *kaljimba;* these them in return, *nomara.*

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MBUTJANA-women : *maia;* these them, *amba.*
Men : *gamena;* these them, *amba.*
BELTARA-women: *wunjinga;* these them, *lirra, katjia;* the mother and sisters of the husband, *kwaianirra;* these the wife and sister of the son, *lirranirra.*
Men : *kata;* these them, *lirra* or *katjia;* the husband and brothers of the daughter, *wuiamahra.*
PUNGATA-women : *wunjinga;* these them, *lirra, katjia.*
Men : *kata;* these them, *lirra, katjia.*

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6. TRIBAL MARKS OR TOKENS.

The classes possess no class-marks, but the tribes living southerly and westerly from here, called *loritja*, have one in common with ours distinguishing them from those dwelling north and east, who are called *ulpma.* The mark of the latter consists of emu feathers worn on the forehead and upper part of the arm, while that of the former is made of small sticks scraped into little bunches of shavings, which they wear upon the head.

c. ARTS.

The arts of this people are not of much account. Still, it is astonishing how they can have produced some of their utensils with their rude tools, such as stone axes and knives. These consist of a kind of sharp flint, which is found south of the Krichauff Range, and which these natives barter for other things. To make an axe they take a piece of wood with a fork at one end, into which they fix the stone with resin. The latter they prepare by crushing it moderately fine between stones, sprinkling some water upon it, holding it over the fire until it melts, and then kneading it well together. The stone-knife is fixed to the handle of their *tmera*, and is more like a chisel than a knife. The *tmera* is a trough-shaped piece of wood hollowed out thinly, and about two feet long, somewhat bent together at both sides, straight and open at both ends. One end has a barb for throwing spears; the other forms a flat handle with the stone-knife fastened to it. They fix the spear to the barb, grip the handle of the *tmera* and the spear with the same hand, throwing the latter only. The spears (*tjata*) are made of various kinds of wood suitable for the purpose, such as *Tecoma australis, Acacia aneura,* &c., and thinner at the hinder than at the anterior extremity, being respectively about the thickness of a thumb and of a little finger. The length varies from six feet to ten feet, according to the intended use. For fishing short ones are used, without barbs, and made out of one piece; others have an extra piece, six to eight inches long at the point, made of hard wood (*Acacia*

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Kempeana) as a headpiece, which is fixed with the sinews of marsupial rats to the shaft. Fastened to this is a small barb, a few inches distant from the end, which terminates flatly instead of cylindrically. If the shaft becomes too short, it is lengthened by another piece firmly fastened on with sinews. They are generally called by the name of the wood employed in their manufacture. For defence they have a shield, *ulkuta*, two to three feet long, and one foot wide, made of the wood of *Erythrina vespertilio*, of trough-like shape, and with a handle on the inner face. Various sized domestic utensils for food and water consist of hollowed wooden basins, made of different kinds of timber, which are used also as substitutes for cradles, &c. Wherever a mother goes she takes her baby with her, carrying it in one of the troughs under her arm and resting it on her hip.

A thick stick, five to seven feet long, serves as support to the old people, and is used by the women to dig out roots, worms, or rats. Frequently this stick is also used for chastising purposes even to the effusion of blood or stunning the culprit. The men have a shorter stick about two feet long, but do not employ it as frequently as the women, because they are obliged to go out hunting, and when quarrels arise they use their spears. From the skins of marsupials bags are made, but rags are beginning to be used instead. If they happen to pick up a piece of iron, they make a handle with rags and sharpen one end upon sandstone. For filling cracks in their basins, and for fixing the stones in their weapons, resin from a certain species of porcupine-grass is used.* They bruise this grass until the resin becomes fluid, and then knead it into a single lump. When they wish to plug up a crack, they soften the mass with heat, and then press it into the fissure. It resembles black sealing-wax, but is not quite as brittle. They call it *nurbma*. Of the hair of various kinds of marsupials they spin cords for ornamental purposes, and amulets, and charms. For the latter purpose they also use the hair of the dead. For spinning they bark a small stick, eight to ten inches long, form a slit, and put a short crosspiece through, so as to form a kind of cross. At the lower end it is pointed. When used it is placed upon the thigh, and with the hair rolled rapidly towards the knee, twisting the hairs together as it revolves. When the yarn has attained a length of two to three feet, it is wound up around the crosspiece. When quite full, the yarn is removed, being wound into two balls. It is converted into thread in the same manner, only that the motion is reversed.

The natives have also some knowledge of the use of drugs. They employ teas made of the leaves and bark of some shrubs

* Probably *Triodia Mitchelli*, or *T. pungens*, both of which have viscid leaf-sheaths [Ed.]

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and the whole plant of others, which they drink. Thus they sue *Callitris verrucosa*, *Acacia sentis*, *A. strophiolata*, *Stemodia*, *Cynanchum floribundum*, &c.

d. DRESS.

These aborigines are absolutely nude. They practise a certain decorum, which decrees that the two sexes keep 10 to 15 paces apart when they meet, and if necessity compels a closer approach they keep their backs towards one another, or the women step quickly aside. But during quarrels, or in the event of sickness or death, all modesty is thrown aside, and they mix indiscriminately together. In winter they remain between the fires until the sun shines warmly. If they have to go away, they take a fire-stick with them for warmth or to rekindle another if necessary. If they have none they make fire by means of two sticks, which they rub together, holding finely-scraped shavings to the rubbed place. Usually they employ their shield, which is of soft wood, for this purpose, together with the *tmera*, which is of harder wood.

European clothing they like very well. If they can get hold of any old rag they put it on, even if it be only a stocking, boot, hat, or waistcoat, often presenting a ludicrous appearance. Such an article of clothing will circulate among them, one wearing it to-day, another to-morrow. But they have no idea of taking care of clothing, which speedily becomes destroyed.

e. ORNAMENTS.

In ornamenting their bodies the natives devote much time and care, especially the men, which includes anointing it with fat to make it shine. Tattooing is also practised, which they call *urbmalilama;* it is performed on the chest and upper arm, and consists of longitudinal and transverse lines. Usually the son adopts the pattern of his father, but sometimes chooses one according to his own taste. Both sexes tattoo themselves. It is done during childhood, either by themselves or by others for them. Some of the natives have a great number of scars on the chest and arm, produced by scratching the skin lightly with their *irgalla*, or stone knife, or else with a small piece of wood, *ntjala*, or with the shinbone of a kangaroo, about six inches long, and pointed at one end, and then applying powdered charcoal to the wounds, which causes thick rounded scars. Their hair is intertwined with string dyed white with clay, and ornamented with a tuft of white feathers, called *ndualja*. Sometimes they wear three tufts of rats' tails, viz., one in front of the forehead, and one on each side; these they call *albeta*. Through the septum of the nose they bore a hole, quite near the point, through which the *lalkara* is worn. This ornament is made of the wingbone of

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a vulture (?) or the Spoonbill Goose, being pointed at one end, blunt at the other, and about six inches long. Besides the above they wear tufts of white feathers attached to the upper arm. The principal adornment, however, consists in the *ulbelalama, i.e.*, the painting of the body with yellow, red, and white clay, ochre, &c., into various patterns. They have, however, certain rules and a certain order for this, to which they adhere. The usual decoration consists—besides the ornaments mentioned above—of a semicircular red or white streak above the nose and on the cheeks, the convexity upwards; red or white dots on the forehead; and several elongated curved red streaks on the chest and abdomen, which gradually lengthen, so that one ring-segment overlaps and encloses the other.

A messenger, however, wears red strings in his hair; four tufts formed of finely-split and scraped sticks some five to seven inches long, fixed upon the head, and called *lilinba;* a thick black dot or broad streak painted on the forehead; and a semi-circular one of red paint over the nose. Besides the concentric oval red streaks on the chest and abdomen mentioned above, two red and black ones of semicircular form, and turned upwards, are placed above the former. On both sides elongated red streaks are made, which look like bundles of sticks. Upon the back the messenger has a sort of red disk, formed of concentric rings, with four half-round disks, also consisting of concentric curves. Other figures are painted for their *tjurunga*, corroborees, of which more will be said hereafter.

f. HABITATIONS.

The natives do not expend much labor upon their dwellings. In half an hour they can erect a shelter. They gather bushes or branches, which they stick into the ground in a circle of five to seven feet in diameter, the largest first, with the tops touching; the gaps are then filled up with smaller branches, and the dwelling is finished, an entrance being left on one side. If rain threatens, grass or anything they can get hold of is heaped upon the "wurley," making it look like a rubbish-heap. Inside the ground is loosened, and the earth pushed against the walls, so that the floor resembles a shallow bowl. The locality for a settlement is usually decided by the elders. They are not at all particular, building in river-beds, on elevations, &c., the principal consideration being the proximity of water, and that the soil be not too hard. Each one erects his hut wherever it suits him. This work is chiefly done by the women. Separate places are assigned for the unmarried men and for the single females respectively, the latter being called *lukara*, and the former *nkanja*. If a married couple cannot agree, one or the other of the couple withdraws to one of them. Sometimes it happens that the hus-

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band goes to the *lukara* with a stick, and fetches his wife back again, which rarely passes off without much turmoil. The pregnant women also live in the *lukara*, and build themselves one or more huts, from which the young men usually keep away. By day the young natives sit in the shade (*bunja*) of a tree, and by night sleep in the open-air; if it rains, they see where they can get a lodging. A village is called *tmara*, a single hut *lunga*—*i.e.*, shade, the only purpose it is intended for. Wherever the shadow falls, there they sit or lie, in the morning on the western, in the evening on the eastern side, at mid-day inside, or under a tree, the fire being close by. At night all sleep outside, even during the cold winter, arranging themselves between the fires. It is only during rainy weather that they go inside their huts. When a member of the family dies, the hut is burnt down, and the whole village shifted to some distant place. A council-hut is not built. If the men desire to discuss anything, they sit aside in the shade of a tree, or under the open sky.

g. FOOD.

Although the country is but poor, the natives have a number of articles of food, many of them not of a choice or very digestible nature. They divide these nominally into four classes, viz., (1) *garra*, meat; (2) *ntjaba*, worms and beetles; (3) *mana*, plants, vegetables; (4) *unkuala*, sweets.

1. *Garra.* Their meat consists of marsupials, *tanatana*; birds, *deba*; fishes, *irbunga*; lizards, *loatjira*; snakes, *apma*.

The natives hunt all kinds of marsupials with the greatest zest, from the largest kangaroo down to the smallest mouse-like animal, or dig them out of the ground. The larger the animal the better pleased they are, but they refuse none. The hunting of these is the privilege of the men, accompanied by the bigger boys. They leave in the morning, taking with them their spears, *tmera*, and sticks, usually going in pairs, or several together. They like windy or stormy weather best. On such occasions they hasten away, for the game is confused, and remains crouching, or hiding the head in a bush. The hunters advance against the wind, or sideways to it, in order that they may be neither heard nor scented, and in this way they usually secure abundant booty. They often light extensive fires to confuse the animals, and make it easy for them to spear them. They employ all sorts of decoys. Espying some game at a distance, one of them endeavors to attract its attention by various movements, while the other approaches unseen from behind to spear it. They also go out hunting in bright moonlight. The women are allowed to dig out the animals which burrow.

Lizards or snakes are captured by means of spears, sticks, or

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stones, both by the men and the women. All the large or moderately-sized lizards and non-venomous snakes are esteemed as tit-bits. Their success in capturing birds is but slight; turkeys and pheasants but rarely, and emus only at their drinking places. For this purpose a hiding place of bushes is constructed quite near to the water, whence they spear them. They also put bushes of *Duboisia Hopwoodi* into the water, which intoxicates the birds, making them easy to spear. But other animals become poisoned, only escaping to die subsequently, so it is said. Young birds, especially parrots, when these are almost fledged, fall an easy prey to them. Sometimes they capture whole basins full of young birds. The eggs, especially those of emus, turkeys, and pheasants, are much prized.

Fish of large size are speared by men and boys, and eaten. When the water in the holes shrinks, they construct a barrier of bushes at one end across the water, and which is thus pushed slowly towards the other end, thus driving the fishes forward into shallows, or causing them to become entangled in the branches, when they are easily caught. This work is done by men as well as women. Crayfish are not eaten.

All the above animals are roasted in hot ashes and eaten, even to the entrails, the coarser contents only being shaken out.

2. *Njaba.* In this class of food are included insects, caterpillars, and all kinds of wood-grubs. In summer a kind of insect (Cicada sp.) comes out of the ground wherever *Eucalyptus rostrata* occurs. This the natives call *alknenera.* The males produce an incessant strident noise by means of two chambers, one on each side, united by a transverse channel across the underside. A somewhat smaller kind occurs where *Acacia aneura* grows. Of these insects the natives collect whole basinfuls, roast, and eat them. A peculiar kind of caterpillar (*weba*) appears usually in immense numbers after rain in summer. These they eat also with relish when roasted. Most of the woody plants, especially in the roots, contain grubs, the largest being about as long and as thick as a finger. Whilst all these are considered delicacies, they will not eat locusts.

3. *Mana,* vegetable food. This food the women are obliged to provide. Several kinds of yams (*woritja*) grow here, one attaining to the size of a man's head or more, but all very fibrous. Under the term *angna* the natives include the various larger and smaller fruits of capers, cucumbers, convolvuli, nightshades, mistletoes, and those of some shrubs whose berries resemble bilberries. The taste of the latter is not unpleasant, but the interior is almost all stone, as with the fruits of *Santalum acuminatum.* All the other fruits have a harsh, sharp taste, and consist almost entirely of seeds. They are eaten either raw or

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roasted. The natives also collect the ripe seeds of various species of Acacia, first roast, and then grind them with water upon stones to a kind of paste, which they at once eat. Of these seeds they might at times collect large quantities and store them, the bushes bearing most profusely, but it never occurs to them to do this. *Ntanga* are seeds of various grasses and herbs which are collected by them in their trough-like basins, then ground down with water into a paste, and poured into hot ashes and baked. This is their *egalla—i.e.*, bread. Unfortunately, they have it only rarely, and but little at a time. A few kinds of herbs, inclusive of wild cress, they pick and stew green in the following way:—First, they light a large fire on the sand, remove this, and scrape the hot sand aside, so that a shallow depression is formed. Into this they place flat stones, spread the moistened cress upon them, and cover it over with other flat stones. The heated sand is heaped over the lot. After a while this is carefully swept aside, and the cress or other herb is found to be nicely stewed; it tastes best of all their *mana*. When nothing else is to be had, the roots of various grasses and shrubs are collected, as, for example, those of the common reeds, &c. These are roasted and pounded with stones to soften them somewhat and make them less fibrous. They are swallowed in pieces, for chewing has no effect, as they remain wood-like. A real "bread of misery." The young roots of the reed are the best, but they do not long remain fresh. Sometimes after rain pea-like bulbs are found in large numbers, which have a nice, nut-like taste. These bulbs are partly eaten raw, and partly roasted.

4. *Unkuala*, sweetmeats. These comprise honey, the nectar of flowers, and the exudations of several trees and shrubs (resin, gum), and even one species of ant. There are two kinds of bees here, viz., a dark-colored one, which builds in hollow trees, and a light-colored, greenish species, that nests in the ground. The former sting a little, the latter not at all. The getting of the honey is a privilege of the men. With their stone axes (now they use tomahawks) they cut a hole down to the honey. While eating the honey, a few wings, legs, or even entire bees may be swallowed in their greedy haste. After rains in spring the blossoms of some plants are so full of nectar that it drops out, especially from those of *Grevillea juncifolia*. The natives collect such flowers in their basins, pour water upon them, knead well, and then drink the water, or else they put a handful of flowers in the mouth and suck the nectar, wholly indifferent to the vermin infesting them. The exudations of shrubs and trees from trunk and leaves serve as bonbons for the natives. The ants mentioned are as large as peas, clear as glass, pale-colored, and viscid.*

* Doubtlessly the honey-secreting individuals of *Campotropus inflatus*, *Melophorus Bagoti*, Lubbock, or undescribed species.—[ED.]

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The natives eat anywhere, most frequently, of course, on the shady or sheltered side of their hut. They eat when hungry, and whatever is handy, even in the middle of the night the pounding of the roots being often heard. The principal meal is generally taken toward evening, when returning from the hunt and the *mana*-gathering. The women collect the fuel, carrying their *mana* and little children in troughs under the arms, while the bigger ones trot along beside them. When the food is ready it is eaten, and the duration of the meal is determined by the quantity of food available. The father tears up the meat, or cuts it with his stone knife, and throws a piece to each one—wife, children, &c. When the father has brought home any big game, onlookers in number appear, and also get a piece each. Certain of the women remain at home in turn to take care of the children, and are also supplied. There is often squabbling as to who shall act nurse, because they like best to stay at home. The natives eat of their stock as long as it lasts, and are gluttonous; but the meat must be well cooked, for they will not eat it underdone, and still less raw.

The natives to the south eat human flesh. It is said that they engage in regular human-hunting parties for this purpose. The father and a brother of one of our converts are said to have fallen victims to this practice, whilst the mother had a narrow escape. It is even said that they roast and eat their own infants, if they succeed each other too quickly. Only last year a woman not far from here did it, and when she was reproved for so doing, by means of an interpreter (for they speak a different language), she was surprised at being found fault with, as she considered the roasting and eating of her own child as something quite natural!

h. VISITING.

The natives are fond of visiting. The meeting place is usually the *tmara nkanja* for the men, *i.e.*, the bachelors' camp; whilst the women go to the *tmara lukara*, or women's quarter. They are extremely fond of narratives, or any news. When strangers arrive they become quite animated, receive them in style, and treat them as well as they are able, introducing them to those in the camp. The reception ceremonies have already been described, when treating of courtesy. When these are over they sit down together and begin to converse, the men congregating at one place the women at another. The latter have no household cares to divert their attention. They offer their guests just whatever they have handy; if they have nothing the guests get nothing, and take it as a matter of course, for it is as they would act themselves. The rule is that the *Beltara* treats *Beltara*, *Gomara* the *Gomara*, &c. Strangers usually sleep together at a separat

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place. Next day the visitors stay in the camp while the hosts go hunting to obtain provisions for all. The following day the visitors also go out for that purpose, and usually, all together, after having eaten. Presents are always given to the visitors, such as a spear, *ulkuta*, or other thing. Something uncommon is preferred, such as a knife, pipe, tobacco, tomahawk, or even the shirt off their backs. They would rather go naked than allow their visitors to depart without a present, especially when they know that a certain article was much coveted. When taking leave invitations to return the visit are given, which are accepted and carried out, unless a murder in the meantime prevents it. For it occurs occasionally that spies mix with the visitors in order to gain information to allow of the execution of a pre-determined vengeance. The rejoicing is then converted into the most bitter grief, and friendship into deadly enmity.

i. SORCERERS.

According to their views all serious diseases are produced by demons, or by means of sorcery, and may be counteracted by various performances. These consist almost exclusively in sucking. The medicine- or *ngankara*-man applies his mouth to the affected part, sucks it, and then pretends to have extracted charcoal or other matter that had been inserted by sorcerers or demons. After each sucking, the *ngankara* goes a few paces aside, and spits it out with various ceremonies, putting his hand to the mouth and pretending to take out something, and to throw it away. Almost all the old or middle-aged men are such *ngankara*. According to their own account, they become such when they feel pain in the ears by night, pretending, and perhaps believing, that thus they have acquired the power. All the others believe it implicitly, and try to secure their assistance in all diseases. Usually they visit the sick without being specially called, and render their services gratuitously, being satisfied with the honor. If taxed with the deception practised, they look embarrassed, but find it difficult to discontinue the practice. In difficulties men are apt to look for visible and tangible aid; and others to pose as capable of helping.

k. GESTICULATION.

The gestures and pantomimic expressions of the natives are highly developed. They can express a great deal by means of most varied motions of the hand, and thus communicate with another.

l. VOWS OR OATHS.

Our natives have ceremonies by which they consider themselves bound. As an illustration the following anecdote will serve:—A few years ago they approached us anxiously and in great agita-

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tion, and shouted "*tnenka bitjirirama*"—*i.e.*, enemies are coming. At first we would not believe it, until we espied a small troup of natives approaching. We now took up our weapons and went to meet them, whilst the others remained behind, though fully armed. Both parties were requested to lay down their arms, which they finally did, and we exhorted them to settle their differences in peace. After a long discussion some of either side sat down, embraced, and then cut small wounds into each other's backs, so that they bled. The four who did this were the intended victims out of revenge, and the avengers or intended murderers. No evil has befallen these four since.

m. MURDERERS.

These are looked up to as heroes, notwithstanding their cowardice and cunning; and death by spearing is counted as honorable, although they are so terribly afraid of it.

5. Family Life.

The family life of the natives is intimately connected with the social eight-class system. A youth cannot select a bride for himself, or a girl her bridegroom. The betrothal is solely and absolutely arranged by the father of the girl. He promises and contracts his daughter, within the limits of the class, to whomsoever he pleases, either to a *gamena* or *rendera*. The betrothal is often made by the father soon after the girl is born from mercenary motives, for it is seemly that the son-in-law prove himself grateful by frequently handing over to his father-in-law and his bride part of his hunting booty, and helping thus to provide for him in his old age. The bridegroom, *noatjinga*, is thus usually several, often many, years older than his bride, *kurkibana*, and cohabits with her sometimes when she is only seven or eight years old, and still a mere child. As soon as she attains puberty, he claims, and takes her away as his wife, without any initial ceremonies. He may, perhaps, present his bride with a *gulatja*, *i.e.*, necklace of rat-tails, her father with a spear, &c., and her mother with something else. The young woman builds a hut, and they live together afterwards as man and wife, no special festivities taking place. At most, the bridegroom may try to capture some game on their way to his camp, which they, if he be successful, consume together. If the young wife does not like her husband—a by-no-means unusual thing—she soon runs away from him; he follows her, and when caught gives her a beating to make her behave better in the future. Now, when the wife runs away, she goes to white people, and the husband does not venture to ill-use her, but has to wait until it pleases her to return of her own will, and then gladly enough receives her. Very often it happens that if the man has another, older, wife, she conceives a

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grudge against the younger, and beats her. The husband attempts to maintain an armed neutrality with his stick. This sometimes causes the elder one to leave, which the husband allows, until he wants her, when he goes for her. This is usually when the younger one is far advanced in pregnancy, and is residing mostly at the *lukara*. As long as the husband does not reclaim her, the wife is considered to be a widow. Some married couples agree very well together, live frequently quite alone in solitude, and together provide for their wants. If a man has two or three wives, and one of them is troublesome, he will present her to one of his friends who belongs to the same class.

These natives believe that the souls of the infants dwell in the foliage of the trees, and that they are carried there by the good mountain spirits, *tuanjiraka*, and their wives, *melbata*. The nearest tree to a woman when she feels the first pain of parturition, she calls *ngirra*, as they are under the impression that the *guruna*, or soul, has then entered from it into the child. Such a tree is left untouched, as they believe that whoever should happen to break off even a single branch would become sick. But if the tree should be injured or broken down by winds or floods, that person would get ill whose *ngirra* the tree was.

When the infant is about to be born, the mother usually goes aside into the bushes, away from the hut. Her mother and sisters go to see her there from time to time, but especially the children, who are very inquisitive. The latter are not ordered off, and are often the only human beings present. When the babe is born, the mother cuts off the placental cord by means of two stones, at a length of several inches, rubs a little dirt on to it, and puts the infant in a trough beside herself. Water is never applied, and only the grossest impurities removed with some sand. Usually deliveries are easy; no fatal cases have ever been reported to us. As soon as the woman feels herself sufficiently recovered, perhaps in an hour or two, she gets up and walks about with the child in the trough under her arm. If twins be born of the same sex the youngest is killed, but if not, the boy is spared. Miscarriages occur very rarely. The mother waits several days before showing the father the child, by which time it has become somewhat dusky in color. Mothers suckle their children often until the third or fourth year, and if she is absent, another suckles it for her.

Of a proper training of the children they have no idea at all. They allow them to grow up wild. If the children are unruly, the mothers try to quiet them with fair words, or may scold them a little, or even slap them gently, but never take any extreme means. If children quarrel, and one mother ventures to strike the child of another ever so slightly, there is sure to arise a

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disturbance between the two, followed by blows and the effusion of blood. When a child gets hurt, either by falling from a tree, or into the fire, &c., the women set up a terrible howling at once. The children show no affection for their parents, and sometimes leave them as early as at six years of age to rove about with others. Such a vagabond kind of life they love dearly, and, for this reason, delight much in riding about on horseback with white people. The girls are hard to train to domestic work, and the boys to any occupation binding them to a certain place.

When a child sickens, the mother takes it in her lap, and does not leave the spot, the father sitting near by; from time to time others join the group. If the illness becomes serious they begin to scream, and the women throw themselves over the patient, covering him with the upper part of their bodies, so that he is suffocated. The same is done with other persons when very seriously ill. But for this habit some might recover. An illustrative case came under our observation. The women having crowded over the patient as usual we drove them away, and gave the child some medicine. It got better, and is alive at the present day. Since then the natives have discontinued the practice, and always ask for advice in the illness of their children. When the patient has breathed his last the lamentations and mournings become accentuated. The eldest person in the camp shouts at intervals some five or six, long-drawn, mournful sounds in a deep bass voice, and with widely-open mouth. At the same time the others throw sand and ashes over each other, untie their hair so that it hangs in a dishevelled mass, the women lacerating their heads with their pointed sticks, and the men cutting each other's backs so that the blood flows. And why? They want to propitiate Death, so that he may not take them as well! There the majority crouch near the dead for a short while with the head hung low, while a few depart in haste to dig the grave. All persons present in the camp assemble at the place of mourning, the corpse still lying upon the lap of the mother or the wife or sister, and covered by the bodies of other women. The graves for men are dug by men only, those for women and children partly by men and partly by women, a sandy spot being selected for the purpose, situated at some considerable distance from the camp. The earth is loosened with the stick and thrown out with a trough, until the hole is four to five feet deep, and so wide that a man can work comfortably in it. Then an excavation is made at the bottom on the side toward their *tmara altjira*—*i.e.*, the place where the mother of the dead person was born—forming a lateral chamber. When the grave is finished the gravediggers step close up to the corpse, putting their long beards between their teeth, holding it firmly, and making the most grotesque

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grimaces. Why? To frighten the ghost of the dead *ltana*, that he may not venture to injure them. Quickly the women are pushed aside, four persons seize the corpse and run with it to the grave, followed by the rest at some distance. On the way others relieve the first, proceeding rapidly onward. Arriving at the grave, one of the men jumps in, the bearers bend the limbs of the corpse against the belly, and hand it down to the man. The latter places it in the side chamber on its side, with the face directed towards the *tmara altjira;* the opening of the chamber is then closed with brushwood, and the grave filled up with earth. The body is placed in the side chamber so that no weight may oppress it, and induce the *ltana* to injure the relations, or remove itself quickly to the *tmara altjira*. Over the main hole of the grave a small mound is raised, and within a radius of several paces all bushes, wood, stones, and grass are most carefully removed. Why? That the ghost, *ltana*, may not find his way readily and hurry off to his *tmara altjira*. Everything is done in a furious haste, and when completed they return to their *tmara* and continue the lamentations. Soon after the hut of the departed is burnt down, with all his earthly possessions, that the *ltana* may not return and injure his kin or other persons. Moreover, the camp is shifted at once to another place for fear of the *ltana*. Next morning the nearest relations leave the camp for some weeks to forget their sorrow, or, perhaps, from fear. The next thing done is to smear the body with white earth—the women all over, the men only the face and chest—and to cut off the hair, in order to make themselves unrecognisable to the *ltana;* and is so effective that they are not readily recognisable at first. As long as the near relations are absent, little mourning and lamenting is indulged in, but as soon as they appear the mournful cries are renewed. Some days after, a number of the natives go to the grave very early in the morning to raise their lamentation there, place brushwood and bones upon it, and sprinkle it with water to satisfy *ltana*, and to induce him to consider that his dwelling, and inflict no evil. Finally white earth is placed upon or sprinkled over the grave that they may soon forget the dead one, whose name, indeed, is never mentioned again for fear he might hear it and do some injury. If others arrive from afar, they go first to the mourners and sit down with them, the women behind the men, the men behind the women, and those of the same sex beside or before each other, and show their sympathy with them by crying and lamenting for a while. When information is received that a man has been speared, or a man or a woman killed, &c., weeping, lamenting, and shouting at once begins. Such a dead person is buried by the finder, and the wife or wives are married by the brother next following in age. He does not assume an

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additional burden by so doing, for they provide for themselves and their children. When he has something, he divides it with them, and in return receives his share of their *mana*. Orphans fare the worst, and usually the nearest relative looks after them, but does not assume a parent's position. Such children receive blows, and have to provide for themselves as best they can.

The avenging of a murder is the duty of the nearest relatives of the murdered person. But how do they know who committed the deed? This is an open secret, for all know the deplorable customs, and consequently each other's enemies. The murdered person and his relatives were perfectly aware whom he had killed, and the nearest relatives of the latter were his avengers, whom they knew well also, and, therefore, the murderer, *urana*. The practice of sorcery makes a slight difference, which will be explained hereafter. If the relatives of a murdered murderer considered that their father, brother, or son had deserved his violent death, all would be well, but this they do not by any means. They accordingly devise and plan how to inflict the same upon the *urana* of their own relation, or upon his next of kin, the *aruninja*. If it cannot be done at once—the brothers or children being, perhaps, yet too young—it is done in the course of time—being never forgotten. The most suitable opportunity is waited for; the murderer and his next of kin, perhaps, become careless, indifferent, or negligent; one of them lives, perhaps, alone for a time at a lonely place. If the avengers become aware of this, they leave at night, surprise, and kill him, for which purpose they paint the whole body a deep black. These avengers know perfectly well what fate awaits them, and that some day they will become its victims, and, therefore, there is no end to the feud. To this must be added the murders occasioned by their belief in sorcery. If the avengers—for almost always there are several, at least two, because no one ventures to go out alone upon a blood-hunt—succeed in obtaining the assistance of a number of abettors, and feel sufficiently confident of their overwhelming force, they attack their enemies by daylight, and are then called *tnenka*, on account of the open invasion; but *urana* if the deed is done secretly.

6. Government.

The natives around the mission station have a kind of government, being ruled by the aged men and medicine-men. It more often fails than not just where it ought to act, as, for example, in putting down the murders. On the contrary, these deeds are encouraged. This state of affairs arises from the fact that they form no nation, nationality, tribe, or triblets. Properly one can only speak of families among them, and these possess equal

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rights as regards each other, only those families which are inter-related being more intimately united amongst themselves. But even among the related ones such murders may occur, as is shown by the following incident. There live here two distantly related families, the head of one of them having a second wife, who comes from the MacDonnell Ranges, who is rarely in this locality. Last year the old and solitary wife of the head of the other family went to the MacDonnell Ranges, as was her custom, and was beaten so severely by the other woman and her relations, that she succumbed to her wounds on her way back. For what reason? The daughter of the aggressor, by another long since deceased husband, had died shortly before. The old people and the sorcerers concluded that she had been killed by the son of this old woman by means of witchcraft. As this son was blind, and always stays here, they could not easily get hold of him, so the mother, or next of kin, had to suffer and die instead. The husband of this murderess is extremely irritated about it, and would like to go and punish his wife by beating her as severely. He has only abstained from doing this because we placed the consequences of such action clearly before him, namely, that he would beat her till she died, and then her relative would avenge her by killing him. It is a sad case where there is no proper government. It is only in a few instances that the authority of the aboriginal government can be perceived. Thus, when a new camp is to be pitched, or a settlement formed, the old people indicate the spot. Also, in the event of dissensions, an order or rule is obeyed preventing these from ending in murder, for under the influence of violent anger the natives have no self-control. Consequently as soon as two men become angry and proceed to high words, the others hasten to interpose themselves fully armed, to conciliate as much as possible, and even to part the disputants forcibly. As a result, the disturbance ends, usually in such cases, in the antagonists only inflicting wounds with knives or spears in the thick flesh of the thighs. Afterwards, the one who commenced using violent means, or, if it has not gone so far, the one who started the quarrel has to leave the place, and is practically exiled for a certain period. Knowing this rule, the guilty person starts voluntarily the following morning, without the least opposition, and when he returns everything is forgiven and forgotten.

There is also a law or rule in respect of widows. A widow must marry the younger brother of the deceased. The latter never objects, for men are always pleased to have as many wives as they can get, but it happens sometimes that the widow is not willing, and does not like the man. However, the *knirabata* and *ngankara*, old men and the sorcerers, try to enforce the rule by argument and persuasion, and, if this be ineffective, by scolds

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and threats, the latter referring to their magic powers. These are the principal means whereby the aged and the sorcerers attempt to attain and retain respect and authority, and do gain it. The respect, which is paid them by the women and the younger members, is based on a belief that they do possess magic powers. Notwithstanding all this, it happens that widows do marry their favorites, and follow their own inclination, especially if the legitimate bridegroom does not possess the physical strength to compel compliance, such as being blind, lame, &c. Also, in arranging for feasts, the aged are priviliged, and are the principal organisators of such.

7. Religion.

The well-known festivals or dances of the natives, called by them *tjurunga* and *ildada*, are ordered and arranged by the old people. Each one of these has one or more of these *tjurunga* as his special privilege or monopoly. This right does not pass to his sons as an inheritance. When one of these ancients wishes to celebrate his *tjurunga* he consults with the others, and then messengers are sent by him to the neighbours, inviting them to attend at his *tjurunga*. The invitations are delivered by young men, who ornament themselves in the peculiar manner, explained above, and which renders them at once recognisable as messengers. In the meantime the men at home secretly prepare themselves suitably for the occasion, as no woman or child must see anything of it. The old man whose *tjurunga* it is orders everything to the best of his ability; he alone is supposed to possess the requisite knowledge or original inspiration. Thus one of them owns the *ilia tjurunga*, or emu festival; another the *jarimba tjurunga*, or fish festival, &c. These festivals are no mere pleasure-bouts, but serve another purpose, and have a religious significance. Their proper basis, I believe, is worship, or, more correctly, idolatrous service, and a consideration of the whole surroundings points to this conclusion. It must be mentioned here that the natives possess small disks of slate and wood, about as large as the hand, called *tjurunga arknanoa* (festival plates), which are secreted in caves, and which neither woman nor child must see. Upon these various markings are engraved, which the respective old man to whom they belong alone understands, describing the whole meaning of his *tjurunga*, as to its origin and purport. They pretend that these *tjurunga arknanoa* were *altjira*—that is, were not made —but I suspect, as they occasionally give some to white people, that the old men and sorcerers make them themselves. They also present some occasionally to the young men, and initiate them gradually into the whole secret meaning, and finally, I believe, into the whole system of deception. No one, however, ever reveals the fact, although one may read it in their faces. Why

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not? They fear death; if discovered, it might cost them their life. If one attempts to deprecate the *tjurunga* of the old, it may happen one day that the traducer is killed for this offence, a case of the kind having occurred in the MacDonnell Ranges only a few years ago. The old one whose *tjurunga* it is explains its import and meaning to the uninitiated, and what is it? All the festivals refer exclusively to eating or to the supply of food, and it is pointed out whence the various objects as emu, fishes, &c., are derived; in what number and size they formerly existed, &c., which forms also the burden of their songs. These festivals serve as reminders, and extol the past, conjoined with prayers that these animals, &c., may again appear in the same numbers, of similar size, &c.

According to the nature of the *tjurunga* is the ornamentation of the body; thus for a fish festival the body is painted with fish-like figures, although the figures may be the same for several. The characteristic behaviour and cries of the respective animals is mimicked by the dancers, of which art they are really masters. Sometimes it happens that one or other does not celebrate his festival in his own district, but goes to another with his people, and holds it there that the other people may become acquainted with it. The preparation occupies them usually for days, sometimes for weeks, the chosen spot being cleared of all rubbish until it looks like a tennis-court. The head-dresses and the painting of the body requires also much time.

When everything is ready, the festival commences towards the evening. Women and children hurry towards the spot, and sit down together in a mass at one end of the arena, the men sitting in front of them. The chief old man and the festive dancers sit apart at a little distance. The singing, conducted by the on-lookers, begins. One or two dancers then step forward and execute a dance, consisting in keeping time to the singing by vigorous stamping with the feet, endeavoring at the same time to imitate the peculiarities of the particular animal that lends its name to the festival. After a while a pause is made, succeeded by the performance of another, and thus it goes on throughout the whole night, and for three or four nights in succession, while they rest and sleep by day. During the day the women have to provide the food for eating, and on this account such festivals are always held at a season when some article of food is to be had in abundance and within the immediate neighbourhood.

The following are a few of the native songs to show their form and contents:—

1. "*Titjatitjana jala ramana!*"
   "Large Emu, many tracks!"

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2. "*Magatjagatjana werilankana!*"
"Innumerable Emu have been here!"
3. "*Lambulambila laintjirbmana!*"
"The name of a bird is upon mountain-sized water!"
4. "*Galbmantalanta janian gatitjalanta janian!*"
"Honey much, Yes! yes! Very much; yes! yes!"

Most of the words of these songs are partly obsolete, and partly taken from other dialects. This explains why they are not understood by every one. One knows one song, another a different one, all being connected with the particular *tjurunga*, and derived from their ancestors. Their festivals of circumcision have not been seen by us. What I know of it is only by hear-say, hence I merely mention it. The youths are circumcised at puberty.

Respecting an after-life, the natives say that the souls of all go to *laia*. They cannot explain how this does not accord with the *tmara altjira*, and detailed when speaking about the burial.

By *laia* they understood a lake north from here, on whose shores the souls live, and eat the best of food, which, especially fruit, is found there in great abundance.

8. Superstition and Witchcraft.

The natives are very suspicious of impending evil, and have a great fear of death. Everything unusual or extraordinary in their opinion portends some danger. When an infant is born, its hair, and that of the mother, is cut off, so that both may recover quickly, and grow fat. The natives regard leanness almost as a disgrace, and on this account do all they can to become fat by taking care not to work too much, and lying about and sleeping, or strolling idly. To be able to eat much is accounted honorable, and he who can stow away the largest quantity is respected as a thorough man. Such a one boasts of it, and prides himself at being always hungry, and able to eat. The phrase "*jinga ngaiala nama*"—"I am hungry"—is used frequently, and with emphasis, even when a piece of meat of a pound weight or more has just been consumed. In order to get strong and fat, several cords of the hair of marsupial rats are worn about as thick as a finger, namely, a short, tight-fitting one around the neck, called *gulitja;* a longer one reaching down to the breast, called *matara;* and another, *gulitja*, around the upper arm. These cords serve likewise to fix the tufts of feathers.

The men sometimes cut off the hair of the dead, spin it, and make a kind of net of the thread, which is either worn around the neck, or in the bag under the belt over the hip. Great magic powers are ascribed to this *gururkna*, for he who has got one is always safe, and none can hurt or kill him. The greatest care is

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taken of this charm; if lost, no pains are spared to find it again, and if not recovered, a feeling of insecurity remains. When about to set off on a journey they try earnestly to obtain one, or to borrow one for the occasion. For all that, however, it is astonishing how timid they are. If an unusual noise is heard at night they suspect enemies, even if it is only caused by a harmless animal; nay, when so alarmed, they often mistake trees, animals, &c., for enemies in the broad daylight. Their pernicious customs make this feeling of fear often only too well founded.

Twins portend evil, because uncommon, hence one of the infants has to die; it is said that some kill the boys derived from a white father.

If one falls sick or dies, the natives at once conclude he must have been bewitched, or bitten, or hurt by the devil—*eringa*. At the same time they think they can bewitch others, the old ones and the medicine-men especially fostering that belief. For this purpose they employ various magic agencies as charms, as the following:—

1. *Nguanja*, a stout, oblong piece of wood or bone, resembling a lead pencil, which, when of the latter substance, is made of the tibia, or big bone of the emu. At one end it is a little thicker and blunt, while the opposite extremity is thinner, and tapering to a point. This implement is thrown by the old men and sorcerers in the direction of their enemy to make him sick, or to kill him, as they imagine.

2. *Ntjala*, resembling the former in shape, but made of the shinbone of the kangaroo. The old man or sorcerer points with this at the enemy, who sits near his fire, at some distance, in order to sicken or kill him.

3. *Kwalja-kwalja*, a tuft of emu feathers, worn usually fixed under the belt at the back; it is supposed to protect them from their enemies, and to give the wearer strength to kill them.

4. *Dara*, a tuft of eagle feathers, serving the same purpose as the preceding.

5. *Lalkara*, a little implement about six inches long, and either of wood or bone, which is worn through the septum of the nose, and by means of which they also think they can hurt others.

Finally, in addition, they employ magic songs and spells.

Evil spirits and devils are combated in the same way as we have seen when describing the burial rites.

The following supplementary remarks may be added:—

If a person dies at night, men armed with spears place themselves near by to frighten *ltana* (the spirit), that it may bring no harm to them.

When eclipses of sun or moon take place they fancy that the devil (*erinja*) has placed himself in front of those bodies, and

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throw their spears into the air in all directions, accompanied by great contortions of the body, in order to hunt *erinja* away.

The comets they consider are big men prognosticating ruin and death; these they bind by spells to one spot, so that they cannot get away, but must finally die.

When the Magellanic clouds are visible in the sky, they speak with a subdued voice, or not at all, for they are the poison-fangs of a gigantic snake. This is in order that the latter may not perceive them, else they might be seen, bitten, and die.

Even the whirlwinds are caused by the devil as he rushes through the air, and thereby stirs up the dirt, but they use no spells against them.

The innocent morning and evening stars are said to point out to the old men and sorcerers whom they are to bewitch.

Mongabarra are the souls of living people wandering about at night, seeking to withdraw the fat from the body of others, and to devour it. The mind of the natives being full of such thoughts, they frequently dream of them, and some pretend to have even seen such *mongabarra*. One native told us one morning a *mongabarra* had taken the soul of his granddaughter, but he had run after it, and recovered it again!

If it rains too long the old natives shout out their spells, and strike against the rain with their sticks to compel it to stop.

To the *albeta*—a tuft of tails of the marsupial rats which they wear upon the head—the old men ascribe the property of charming the boys so as to induce them to demand to be circumcised and be made men (*atua*). No doubt the magic force lies really in the open contempt shown towards these boys until they have been operated upon.

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Geological Notes on the Upper Finke River Basin.

By Chas. Chewings, F.R.G.S.

[Communicated by Prof. R. Tate.]

[Read June 2nd, 1891.]

Plate X.[a]

During the first three months of the present year I travelled in zig-zag fashion through and about the watershed of the Finke River, which takes its rise in the ranges near the centre of Australia; and such observations as I then made I now present to the Society, and in doing so, no one is so conscious as myself how incomplete and imperfect my efforts have been.

Pre-Silurian Rocks.

These are found freely distributed throughout the length and breadth of the MacDonnell Ranges. They extend to near the Western Australian boundary on the west, and to the Queensland boundary on the east. On the south the wall-like range, called the MacDonnell Range South, afterwards to be noticed, limits them in that direction; while to the north their extent is not yet known. Throughout they are highly crystalline in structure, distinctly stratified, with a dip in general to the north at a steep angle. Hornblendic rocks give the north side of the ranges and outlying hills a black appearance—on closer observation they weather into rounded masses, and crack in all directions, often circular. Mounts Hay and Chapple Ranges are composed of this rock. Feldspar (probably oligoclase) exists in the district, and I found garnets as well. Impure garnets form a constituent part of the hornblendic schist, which is closely compacted, massive, and intensely hard.

From the appearance of these rocks, the contour of the country, and the remarks made by the late W. C. Gosse and Mr. Charles Winnecke, F.R.G.S., on the Reynold's Range, situated some 90 miles to the north, and the late Colonel Warburton's remarks on the country to the westward and north-west, I am assured that the country now known as the Burt Plain, and from that to the Reynold's Range, has been denuded, and is now many thousands of feet lower than it originally was. It probably averages not less than 2,000 feet above sea-level. This land, which is now a

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level expanse of plain and drifting sandhills, with here and there low bluff hills and salt marshes dotted over it, was at a subsequent period to the Silurian upheaval the highest tract of land in Central Australia.

When the quartzite capping, which will shortly be noticed, became denuded, the pre-Silurian rocks weathered away much faster than the rocks to the south, which are partially in places and wholly in others covered by Silurian quartzites; thus we have high land still where quartzite exists, and lower land where it has been denuded.

The southern edge of the Burt Plain is bounded by an escarpment of crystalline rocks consisting principally of chlorite schists and granite; the escarpment rises abruptly to an average height of 800 to 1,000 feet. These remarks refer to that portion of the range from Mount Zeil to near the Alice Springs. The drainage to the north is short, but the southern drainage starts immediately from the top of the range. This ridge is really the watershed of the MacDonnell Ranges, though higher peaks and ranges exist some few miles farther to the south.

Micaceous schists and metamorphic granite follow on in regular sequence to the south, with occasional outcrops of coarse eruptive granite and other eruptive rocks. Long ridges of hard white quartzite nearly vertically disposed, and dipping comformably with the schistose and stratified granite-rocks run through the country east and west, and form absolutely impassable barriers to the traveller, saving along the creek-channels, which intersect them. These ridges form the highest ranges in the MacDonnell, and mark the lines of faults, which are frequent. Mounts Zeil and Liebig are exceptions, being formed of metamorphic granite. Then follow metamorphosed clays and shales interstratified with yellow and blue crystalline limestone, which conclude the series. In the neighbourhood of these rocks there are marks of great erosion and denudation. Prior to the great Silurian upheaval, hereafter to be mentioned, these rocks were overlain by more than a mile in thickness of Silurian quartzites, limestones and shales; the only remnants of which are the ridges and patches of quartzite and limestone. In the neighbourhood of the granitic dykes the Silurian remnants are much scattered.

Mica is abundant in both eruptive and metamorphic granite, and I feel sure marketable sizes will be found much farther to the west than that discovered at Hartz Range. Quartz reefs are of frequent occurrence throughout the granite and schistose rocks, but I regard the western end of the MacDonnell as a splendid field for the prospector. Topographical surveys and a critical examination of rock specimens can alone determine accurately moot questions on the pre-Silurian rocks of Central Australia, and particularly of the MacDonnell Ranges.

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Silurian Rocks.

The "MacDonnell Ranges South" form a barrier to and rise abruptly from the limestone and shales of pre-Silurian age. I failed to detect any unconformability between them. The escarpment is formed by the denudation of the limestones and shales. It is my opinion that when these rocks were in course of formation, the pre-Silurian rocks were horizontally disposed, otherwise I do not think faults could have occurred and placed such long narrow quartzite ridges in their present positions to the schists had the angle of unconformity been great.

The area over which this formation extends has not been determined in many directions, but sufficient is known to be able to say that it approaches the Musgrave Ranges on the south; on the west it extends well on towards Lake McDonald, on the east to beyond the Hale River, and on the north to and inclusive of the MacDonnell Ranges South. There is every probability that beyond these limits the formation stretches to the south-west, to the north-west, north-east, east, and west, over considerable areas, as I am persuaded from the notes of Gosse and other explorers that it extends to and is largely represented in the Mann, Tomkinson, Petermann, and other Ranges; and much of what has been termed "desert sandstone" must be classed under "Silurian." Similarity of physical structure alone has led to errors.

Two axes produce the Upper Finke basin. The larger and more important runs east and west through the heart of the MacDonnell Ranges. At the time this upheaval transpired the Silurian quartzites were largely represented over the area now occupied by the basin, as proved by fossil and stratagraphical evidence; and were by lateral pressure formed into anticlinal and synclinal folds, which run nearly east and west. With one exception, viz., that of an eruptive outcrop, it forms the bed rock of the basin. The second and lesser runs in a north-westerly and south-easterly direction, and junctions with the first near the western end of the MacDonnells, forming an oblique plication of the Silurian foldings, and also the "basin." The latter determines the western watershed, and the former the northern, of the Finke River and its tributaries. To the north and west of these axes small creeks in comparison with the Finke and its tributaries take their rise, run out into sandhill country, and soon are lost. The Finke may be said to follow the lowest part of the basin, and, like its tributaries, maintains a south-easterly course, occasionally breaking through from one synclinal fold to the next farther south.

To return to the anticlinal and synclinal folds within the basin. How wonderfully even the pressure has been can scarcely be

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imagined; it must be seen to be fully understood. Not only has the pressure produced foldings of great regularity, but now that many of the anticlines are partially denuded it would be difficult to conceive of strata more evenly and beautifully formed. It is the rule, in fact, where the strata stand at all vertical to find high parallel wall-like ranges reaching for miles, sometimes for scores of miles, through, across, or over which the traveller cannot go. It is possible to ride the whole length of the ranges between walls of rock that tower up perpendicularly on either side, and meditate on the time when the narrow plain through which he rides was once filled with limestones, shales, or other rock equally fragile in comparison with quartzite. This description applies wherever the strata are sufficiently vertical, and no newer formation overlies and fills the denuded space.

The folding is traceable to the south and east until covered by Cretaceous and Tertiary formations. The first synclinal forms the valley now called the Missionaries' Plain; it runs from Gardiner's Range to the Hale River. Looking from this plain to the northward the MacDonnell Ranges South rises almost vertically a thousand feet out of the plain; it has a few foothills, which will be noted hereafter, and designated "Pudding-stone Hills." They attain to, if not over, 3,000 feet above sea-level, and all the ranges of crystalline rocks lying behind and to the north of it are hidden from view. Only a few peaks and tops of the highest ridges as they rise a thousand feet higher can be seen. It is thought that many of the highest peaks of the MacDonnell exceed 4,000 feet above the sea, but if I am not mistaken Mount Giles will be found to be the highest elevation. There are four passes through the MacDonnell Ranges South in a distance of 150 miles, viz., Temple Bar, Ellery's Creek, Finke Gorge, and Mareena Bluff, the latter being near the western end. At the three first-mentioned the strata stand nearly vertical, but in the latter inclined to the south, and some 20 miles has to be travelled before the five miles of range in a direct line north and south can be crossed. Travelling northwards through the pass a wide valley is entered. On the western side a horse could walk up the incline to the top of the nearest cliff; to the east towers up a bold headland a thousand feet high at least. The view from near the entrance to the pass is graphically described by Mr. Ernest Giles, F.R.G.S.* The track leads under receding bluffs on the right; the valley gradually closes through the strata becoming more vertical, and eventually a way is found to the north through a creek-gorge by which the pre-Silurian limestones are reached. Apart from the grandeur of the pass, the strata at this place are

* "Geographic Travels in Central Australia," 1875, p. 22.

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so inclined that they can be examined to great advantage, thanks to the quartzite cappings.

It was underneath these bluff-shaped headlands of quartzite that I noticed fragments of fossils amongst the talus, and on climbing-up under one of the bluffs, I discovered some hundreds of feet thick of fossiliferous limestone in thin beds, with intercalated dark-green shales. The limestone was almost wholly composed of fossil shells. I believe they may be had underneath any of the bluffs, and for a distance of 15 or 20 miles without a break. I also found fossils of the same age at the head of both the Walker and Petermann Creeks, which have their commencement on the top of anticlinal folds. The quartzite has been denuded sufficiently to expose the shales and limestones, which have eroded faster than the quartzite sides, and thus a valley has been formed.

A few miles to the west of Mareena Bluff Pass a fault appears on the south side of this range, and exposes a headland of quartzite 1,000 feet thick, horizontally bedded. Wherever this formation is met with the cleavage is most perfect, and where the sandstone remains unaltered, flag-stones of any size may be had.

It would appear that symmetry is the order throughout Central Australian, if not Australian rocks generally. Generalising may be more safely dealt in than in most parts of the world. How regular are the Cretaceous clays and Tertiary rocks overlying them. The Ooraminna (Devonian?) Sandstone is recognisable at a moment when once its characteristics are known. The anticlinal and synclinal foldings of the Silurian formation maintain such good parallels, that when several sections across them are taken, even a few insignificant outcrops appearing above the recent wind-drift sand, connect without fail the lines of folding. The chief upheaval in Central Australia occurred towards, if not at, the close of the Silurian epoch. It was then that the MacDonnell Ranges assumed their general present shape, and the Upper Finke Basin took on much of its present form. In the synclinal fold, in which Tempe Downs Station stands, was next deposited a rock at least 2,000 feet thick, described as

DEVONIAN—(1) MUDSTONE AND (2) OORAMINNA SANDSTONE,

on the top of which, and conforming to it, was laid at least 2,000 feet of sandstone—the middle stratum may be described as a highly ferruginous fine-grained sandstone, and the present uppermost formation a red friable coarse-grained sandstone; sometimes white and feldspathose. It does not conform to the Silurian rocks, and has been only subjected to slight longitudinal pressure in comparison with the Silurian. It has, however, taken

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on in some measure the anticlinals and synclinals of the older rocks. As the horizon cannot be determined until fossils are found we must wait their discovery.

The characteristics of the Ooraminna Sandstone are bold headlands, precipitous sides for 800 feet, cleavage indistinct. It is usually found in localities protected within the synclinal folds of the Silurian quartzites. This extensive formation at one time covered up the James, Gardiners, Geo. Gills, Lewis, and other Ranges, and much of the MacDonnells, not to speak of localities farther afield. The Finke runs over many miles of it, and in the precipitous walls which rise 800 feet on either side the river-bed I saw, when not distant from MacDonnell Ranges, pebbles freely embedded in the sandstone. Flanking the South MacDonnell in the form of foot-hills, but unconformable to the Silurian rocks, are long ridges of pudding-stone extending some 70 miles east and west, and in strike parallel with the Silurian rocks. I noticed at the Gilbert Spring, situated west of the Lutheran Mission Station, pudding-stone similar to that just referred to, and think it highly probable that when the Devonian (?) sandstone was being deposited the MacDonnell Ranges were higher from their base than they are to-day, though probably islands in the sea; the waves dashing against the rocks broke off fragments and distributed them over that part of the basin nearest the MacDonnell Ranges, and thus were formed the pudding-stone hills. I consider it probable the red sandstone and the pudding-stone, which are conformable, are one and the same formation. The part that is left can only be called a remnant of what once existed. In many places near the MacDonnells so much mica is in this rock as a constituent that it glistens in the sunlight. Prior to the deposition of this formation the MacDonnells had been denuded in places of all Silurian formations, for I saw a hill of *pre*-Silurian schists capped by mudstone. The capping of mudstone was dark-red in color, and on climbing to the top of the hill I found the strata were twisted and compressed into almost every conceivable shape.

This brings us to the second series of foldings that Central Australia has undergone. I do not think in this instance there was any great upheaval; nor, for the matter of that, do I think there was in the Silurian upheaval; in both instances lateral pressure from the north disturbed the strata, and in this Devonian (?) disturbance the Silurian and pre-Silurian strata were horizontally compressed into sharper folds, the extent of which is indicated by the gentle anticlinals and synclinals of this formation. Between the Silurian and the Devonian, if we may judge by the appearance of the rocks, there was a wide break, and I saw no intervening strata; on the contrary, the mudstone

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and sandstone abutt right on to the Silurians. Subsequent to the Devonian (?) epoch, it is evident that the MacDonnells were meanwhile degraded to their present level, or nearly so, for out of the valleys in the heart of the MacDonnell rise flat-topped hills, chiefly of coarse sandstone rock frequently porcelainised. Mr. H. Y. L. Brown has expressed the opinion that they may be of

MESOZOIC (?)

age. The strata dip south, as a rule, but sometimes to the north. In the valley in the MacDonnell on which Glen Helen Station stands a few miles of this formation is exposed, but it is being fast eroded. It is probable the horizon will prove to be early Mesozoic. Again, on the sides of the Silurian anticlinals in the James Range remnants of a deposit, containing a large percentage of manganese and iron, resemble these hills in the MacDonnell, as also do several hills in the valley of the Finke, where it debouches from the ranges on to the Great Southern Plain and in other places. A striking resemblance in the dip is noticeable wherever these hills are met with, and they are seen to dip beneath the clays of the Lake Eyre basin.

I have now to record the third series of foldings, and it was lesser than either the Silurian or Devonian (?), and may be termed the "Mesozoic" upheaval.

CRETACEOUS.

How much folding has gone on since the Cretaceous clays of the Lake Eyre basin were laid on is a matter for conjecture, but from exposures I saw near the junction of the Finke and Hugh Rivers, I judge it has undergone slight folding. I saw no trace of this formation within the range-country—it has been pierced where only a few feet thick at the junction of the Palmer and Walker Creeks, and also to the south of that in wells. A limestone-rubble closely compacted with flints and gypsum is the characteristic of this rock on its northern edge, where it rests unconformably on the supposed earlier Mesozoic rocks.

Resting, I take it, unconformably on these rocks, without any very marked change in appearance, and horizontally stratified, next follows the supra-Cretaceous or

TERTIARY

formations, so noted, so weary to travel over. For a description of which I must refer those interested to a paper read before this Society on April 2nd, 1889, by Mr. J. J. East, F.G.S. His travels led him over the eastern part of the MacDonnells, mine the western. For the most part he travelled outside of the Finke valley. In that paper mention is made of some white gritty hills

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with porcelain cappings situated within the MacDonnells near the Elder River. I saw numerous hills of a like character throughout the ranges in my travels. At the extreme head of the Petermann Creek resting on fossiliferous Silurian limestone, and on the Walker Creek resting on mudstone, it may be seen. As a rule the hills are cone-shaped, very white, composed of clay-grit, and always horizontally disposed. There is a difference of 2,000 feet in altitude between the counterpart of these hills in the neighbourhood of Lake Eyre. The interesting problem is, were these hills formed by wind-drift? or were they formed beneath the sea? If from wind-drift, their great elevation is easily accounted for; if on the contrary a marine deposit, it is quite evident Australia was beneath the sea at no very distant geological data. Following on this version, what has become of this immense deposit? and to where has it gone? and by what way? It is so friable that as the waves of the sea gently receded it would be lapped away, and by ocean currents carried to the bottom of some other ocean. But why was Lake Eyre and its basin not filled? or more correctly, why is it a depression? Should not this formation fill it to overflowing? To this may be added that it is evident pre-Silurian and Silurian rocks form the bedding to Lake Amadeus not many feet beneath the blue clay, and farther to the east granite outcrops occur near the western watershed of the Finke. It is possible an ocean current swept through and along this valley, and coming in contact with the Flinders Range rocks carried off all sediment collected on the way, and much of what was already in Lake Eyre basin, which great vortex was probably formed at the close of the Silurian epoch. What treasures of wealth that basin holds can only be told by the diamond drill, but from the fact that coal has been struck at Leigh's Creek, and that the rocks surrounding it on the north and north-west dip into it, it is possible that coal may be found in many places around its edge. To come to a

Conclusion.

The fact is everywhere apparent that rapid degradation is going on throughout Central Australia, especially where the hard rocks are more exposed on the high-lands. The extremes of heat by day, and almost invariably cold nights, cause much contraction and expansion, and the rocks break up. When sufficiently broken the wind, which throughout the summer months blows from the east, carries the sand along and forms sandhills as even as ocean waves. The wind is here a great factor in the transport of eroded rocks, much greater than flood-waters. So porous is the soil that moisture sinks beneath the surface at once in the sandy country, and flows to lower levels. In a few instances an anti-

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clinal brings it to the surface again, but instances are not frequent. A note on the fossils discovered by me has been supplied by Professor Tate, appended herewith, and to whom I am also indebted for a determination of the rock specimens.

NOTE ON THE FOSSILS BY PROFESSOR TATE.

1. FROM the HEAD OF WALKER CREEK and MAREENA BLUFF :—
   Orthoceras sp., related to *O. excentricum*; a cast.
   Raphistoma? sp.; casts of three examples.
   Strophomena sp.; allied to *S. funiculata*, McCoy, but the primary ribs bifurcate.
   Phacops sp.; a tail-piece about $1\frac{1}{4}$ x $1\frac{1}{2}$ inches, composed of at least six segments.

2. FROM PETERMANN CREEK :—
   Orthoceras sp., allied to *O. imbricatum*, the siphuncle very excentric.
   Orthis flabellum.

There is no community of species between the two localities, though at both the facies is decidedly Silurian. The generic determinations of the Mollusca, though probably correct, are based on external resemblances, and therefore subject to revision; the reference of the Trilobite-tail to *Phacops* is perhaps less reliable. This uncertainty of the exact generic location makes any specific determination somewhat untrustworthy; and until a larger number of species have been collected it will be desirable to refrain from an attempt to correlate the formation with any greater degree of definiteness, though the balance of the meagre evidence is in favour of Upper Silurian.

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Note on a Volcanic Ash from the Island of Tanna, New Hebrides.

By Prof. Rennie, M.A., D.Sc., and Mr. E. F. Turner.

[Read August 4, 1891.]

The volcanic ash of which we give an analysis below was forwarded to one of us by the Rev. W. Gray, missionary to the Presbyterian Church of South Australia, in the island of Tanna. The ash was collected at a distance of several miles from the volcano. The following is an extract from Mr. Gray's letter on the subject:—"The cone on the island of Tanna is about 600 feet high. The crater basin, oval in shape, is about a mile in circumference. It is about 200 feet deep, and contains several vents, from which eruptions take place every three minutes or so. The dust is thus thrown out, and carried for more than 20 miles. The heavier stuff falls nearer the cone, the lighter farther away. But the output of dust varies much in this respect. Sometimes there is very little rough stuff in it; sometimes it contains a large proportion of clear white particles. The dust, when accompanied by rain, destroys some kinds of vegetation. It makes water hard, and curdles milk." Mr. Gray also states that the fine "hairs" which it often contains are called Pele's Hair, Pele being the goddess who presides over a volcano in the Hawaiian Islands.

With regard to the destruction of vegetation, the making water hard, and curdling milk, there can be little doubt that these effects are due, not to the ash, but to acid vapours emitted by the volcano during eruption, and carried down with the rain, especially as quantities of sulphur are known to exist in conjunction with the volcano.

The following figures are the mean of those obtained in two closely-agreeing analyses:—

Silica (SiO_2)	57·30
Alumina (Al_2O_3)	17·96
Ferrous oxide (FeO)	5·04
Ferric oxide (Fe_2O_3)	1·56
Manganese oxide (MnO) ...	·36
Lime (CaO)	8·22
Magnesia (MgO)	3·60
Potash (K_2O)	2·60
Soda (Na_2O)	2·80
Phosphorus pentoxide (P_2O_5) ...	·47
	99·91

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Descriptions of New Species of Australian Mollusca, Recent and Fossil.

By Professor Ralph Tate, F.L.S., F.G.S.

[Read September 8, 1891.]

Plate XI.

Genus Siphonalia.

It is generally admitted that *Siphonalia dilatata*, Quoy and Gaimard, and *S. Tasmaniensis*, Adams and Angas, are two sufficiently distinct species; with respect to a third species, *S. maxima*, Tryon, in Manual Conch., 1881, p. 135, t. 54, fig. 355, some doubt has been expressed as to its validity, and after lengthened study of considerable material, having traced-up specimens of *S. Tasmaniensis* from three-fourths of an inch in length to those of seven inches, I have no hesitation in regarding *S. maxima* as the senile stage of *S. Tasmaniensis*.

The species inhabiting South Australian waters are:—

Siphonalia dilatata; *Fusus dilatatus*, Quoy and Gaimard, Voy. Astrolabe, t. 34, figs. 15-16.

This is recorded from Encounter Bay by Angas, 1865, where it is rare.

Siphonalia Tasmaniensis, Adams and Angas *(Fusus)*, Proc. Zool. Soc., 1863, p. 421, t. 37, fig. 1.

S. maxima, Tryon, op. cit.

This has a much longer spire than the preceding, narrower body-whorl, less sharply angulated, with more numerous and obtuse tubercles on the keel.

The species was first recorded by Angas from Hardwicke Bay, where it is a common shell; it also lives among stones at extreme low tides in Encounter Bay.

Siphonalia pyrulata, Reeve *(Fusus)*, Icon. Conch., t. 13, figs. 50*a*-50*b*

The type is from Tasmania, but it also occurs in Port Phillip Bay, and, according to Angas, in Spencer-Gulf.

Siphonalia sulcata, *Lamarck*, sp.

Fusus sulcatus, Lamarck, An. s. Vert., vol. 7, p. 125, 1822.

Siphonalia (Austrofusus) sulcata, Tryon, Man. Conch., 1881, p. 138, t. 56, fig. 380.

Fusus ustulatus, Reeve, Icon. Conch., t. 17, fig. 66; *id.*, Tryon, *loc. cit.*, p. 66, t. 39, fig. 170.

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Judging by the figures representing the Lamarckian species, I am constrained to regard *F. ustulatus*, Reeve, a synonym of it. No locality was known to either Lamarck or Reeve; but Angas recorded *F. ustulatus* from St. Vincent-Gulf, where it has occurred to other collectors in later years. Tryon quotes *S. sulcata* as from South Australia. I have seen Victorian examples of the species.

Siphonalia oligostira, *spec. nov.* Plate xi., fig. 6.

This species resembles *S. Mandarina*, Duclos, of the New Zealand fauna, but the revolving threads on the body-whorl, in particular, are flat and without interstitial threadlets; the whorls are not so regularly convex, being slightly angulated postmedially; the spire is proportionately much broader, and the nucleus consists of one and a half very small turns, whereas in *S. Mandarinus* it is cylindrical, of four whorls.

The species makes a passage between *S. Tasmaniensis* and *S. Mandarinus* in its faint shoulder and obsolete nodosities thereon.

Dimensions.—Length, 88·5; width, 42; length of aperture, 56 mm.

Living on rocks at extreme low tides, Guichen Bay *(S. Aust. Mus.)*; Encounter Bay *(Dr. Verco)*.

Genus Latirofusus, *Cossmann.*

This genus was established by its author in "Annales de la Soc. Roy. Malacologique de Belgique," 1889, p. 175, to include certain shells having the outline of *Fusus*, the plicated columella of *Latirus*, and a globulose embryo. He referred to it the living *Fusus lancea*, Chemnitz, which probably includes *F. acus*, Adams and Reeve, and two species of *Fusus* described by Deshayes from the Eocene of the Paris basin. I venture to describe a second recent species.

Latirofusus nigrofuscus, *spec. nov.* Plate xi., fig. 3.

Shell lanceolate-fusiform, three and a half times as long as wide, aperture one-half of the total length; colour brown under a black epidermis.

Whorls seven and a half; nucleus of one and a half whorls, smooth, hemispheric, and large.

Spire-whorls separated by a linear suture, almost flat, spirally lirate; commencing liræ two, increasing to seven, eight or nine on the penultimate whorl, four of which are usually stouter than the interposed ones. The transverse ornament consists of obscure rounded plications (or they may be wholly obsolete), and of

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minute threadlets separated by slightly wider intervals than their width.

Last whorl with a rounded periphery, ornamented with slender transverse threadlets and stout spiral threads, the latter alternately large and small, about 15 in number, or the intermediate ones nearly equal in size to the primaries. The base is rather abruptly contracted into a moderately long, but stout, canal, ornamented with about eight distant spiral liræ, and transverse threadlets. Aperture narrow-elliptic; outer lip lirate within. Columella with two oblique plaits, the anterior one at the origin of the canal; canal nearly closed by a horizontal plate-like extension of the border.

Length from 21 to 22; breadth from 6 to 6·5 mm.

Dredged in life one and a half miles off Edithburgh, St. Vincent-Gulf, in three to four fathoms, by Mr. E. H. Matthews; also in shell-sand, Aldinga Bay (*Kimber*); Hardwicke and Encounter Bays (*Adcock*).

Diala magna, *spec. nov.* Plate xi., fig. 9.

Whorls nine; apical whorls two and a half, convex, rapidly diminishing, purplish-black; spire-whorls flat, excavated at the suture, slightly incrassated at the anterior suture, smooth, shining, whitish interrupted by axial flames of reddish-purple.

Penultimate whorl with one to three spiral grooves bordering the anterior suture; the colour-stripes on the grooved surface being broken-up into dots.

Body-whorl with a rounded base; the anterior two-thirds with about nine encircling flat ridges, not so wide as the intervening flat furrows, spotted with purplish-red in the sulci; on the posterior one-third the sulci are obsolete and the colour-spots are confluent but in an alignment with the anterior dots; the whole forming axial bands sigmoidally curved, extending from the suture to the extreme front. Growth-lines fine and regular, conspicuous on the base. Aperture subrotund, outer lip thin, peristome incomplete or thinly continuous, columella simple.

Length, 13·0; breadth, 4·5 mm.

Habitat.—Deep water, Port Phillip Bay, Victoria (*J. M. Wilson*).

This species is at once distinguished by its size, its furrowed suture, and the flat distant ribs on the base. Its nearest ally is *D. lauta*, A. Adams, certain individuals of which have a slightly channelled suture, but the basal sulci are linear, and the colour-spots never confluent. Its rounded base separates it from *D. suturalis*, the only other species with distinctly-furrowed suture; whilst the arrangement of the colour is not seen in any other species.

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RECENT AND FOSSIL SPECIES OF LEIOPYRGA.

This genus, founded by Messrs. Adams in 1863, differs from *Bankivia* by its umbilicus. Two living species, both Australian, were described by H. and A. Adams, which remain till now the only representatives of the genus. I have to add one recent species and two from the Older Tertiary of Victoria.

A synopsis of the specific characters is as follows :—

Shell smooth ; earlier spire-whorls subquadrate. *L. picturata.*
Shell with spiral ribs.
Ribs on penultimate whorl, three. *L. cingulata.*
Ribs four, truncated, equal, equidistant ; suture excavated. *L. quadricingulata.*
Ribs three, equal, wavy, with a small one at each suture. *L. Sayceana.*
Ribs eight to ten. *L. octona.*

Leiopyrga picturata, *H. and A. Adams.*

L. picturata, H. and A. Adams, Ann. Mag. Nat. Hist., 1863, p. 19 ; id., Angas, Proc. Zool. Soc., 1865, p. 181 ; 1867, p. 216.

Bankivia (Leiopyrga) picturata, E. A. Smith, Zool. Alert, p. 75.

Trochus (Leiopyrga) picturata, Watson Challenger Gastr., p. 65.

Cantharidus (Leiopyrga) picturata, Tyron, Man. Conch., vol., xi., p. 140, t. 45, figs. 46-48 (1887).

Adams' type is from Port Jackson, where the species is well-known ; Angas reported it from St. Vincent-Gulf, but it has not since been collected in South Australian waters.

Leiopyrga cingulata, *A. Adams.*

Ref.—Proc. Zool. Soc., 1863, p. 507. *Cantharidus (Leiopyrga) cingulata*, Tryon, *op. cit.*, p. 141. Port Essington.

Leiopyrga octona, *spec. nov.* Plate xi., fig. 5.

Shell turrited, narrowly perforate, thin, shining, white, with oblique or axial zigzag pinkish lines.

Whorls eight and a half, moderately convex, separated by a linear suture ; the apical whorls two and a half, turbinately depressed, rufous, smooth. The first two spire-whorls smooth, the third showing faint spiral lines, which increase in strength with the revolution of the spire ; the anterior whorls with about eight to ten equal and equidistant, rounded, and rather depressed cinguli, which are a little wider than the furrows.

Body-whorl equally and regularly cingulated, base convex ; aperture oval ; outer lip thin, crenated on the margin ; columella

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thin, but slightly thickened above, and abruptly attenuate to the front, not perceptibly reflexed; umbilical groove smooth.

Length, 10; breadth, 4·5 mm.

Habitat.—Royston Head, South Yorke-Peninsula (one ex.); King George Sound (one ex.).

This species resembles *L. picturata* in outline, but differs by its conspicuous cinguli, its convex whorls, and linear suture; from *L. cingulata* it would seem to differ in shape and in its numerous encircling ribs.

Leiopyrga quadricingulata, *spec. nov.*

Shell turrited, narrowly perforate, thin, internal shell-layer conspicuously perlaceous.

Whorls eight and a half, flatly convex; apical whorls two and a half, smooth, depressed-turbinate; the next two are quadrate, margined at the suture; the following, with an excavated suture, four-ribbed. The ribs are equal, equidistant, compressed, moderately elevated (sometimes having an undulose outline), separated by much wider flat furrows.

Last whorl usually with intermediate smaller ribs between the primaries; periphery rounded.

Traces of colour are visible on some specimens, consisting of a diffused purplish tinge on a white ground.

Length, 11; breadth, 6 mm.

Habitat.—One of the characteristic fossils of the Miocene-Tertiary at Muddy Creek; also at Kalimna, Gippsland Lakes, Victoria.

Leiopyrga Sayceana, *spec. nov.*

Like *L. quadricingulata*, but the penultimate whorl has three primary, compressed, acute cinguli, equal and equidistant, and a slender thread at each suture. The cinguli have an undulate outline by reason of inconspicuous arched folds which traverse the width of the whorls. All the spire-whorls are cingulate; the suture is more or less concealed by the approximation of the sutural threads.

Length, 11; breadth, 5·5 mm.

Habitat.—In the Eocene-sandstone on the beach at Beaumaris, near Cheltenham, Port Philip Bay, Victoria; not uncommon, according to Mr. Sayce, to whom I am indebted for several examples.

Semele monilis, *spec. nov.* Plate xi., fig 7-7a.

Shell ovate-oblong, somewhat compressed, thin, inequilateral, subinequivalve (the right valve slightly flatter than the left). Anterior side the longer, rounded; the posterior side shorter, obliquely truncate in the ventral-half. Ventral margin arched

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medially, gradually curving upwards to the rounded anterior extremity, abruptly sloping upwards and outwards to join the post-dorsal slope.

Umbos depressed, acute, approximate: lunule very small, but deeply impressed, broadly lanceolate. The ornamentation consists of rather distant, moderately elevated, rounded, concentric liræ; and of thick radial threads, separated by nearly as wide flat furrows. The radial threads pass uninterruptedly across the liræ, where by reason of minute crenulations on the lateral faces of the threads, the appearance of punctated furrows is produced. There are six liræ within a breadth of 5 to 10 mm. from the umbo; the crenulations on the liræ are about 35 in a length of 5 mm. at a distance of 10 mm. from the umbo.

The external colour is a pale-yellow to dirty-white, tinged here and there with rosy blotches having a disposition in the medial and posterior areas to run into flames. The interior is pellucid, changing to opaque-white towards the margin, variegated with blotches and short streaks of a reddish-colour.

Dimensions.—Antero-posterior diameter, 21; anterior radius, 11; posterior radius, 10; ventro-dorsal diameter, 17; thickness at a point a little dorsally to the middle line, 7 mm. A large specimen measures 27·5 by 23 mm.

Habitat.—Cast-up valves at Aldinga (Mr. Kimber); at Moonta Bay (Mr. McDougall). Fresh shells dredged from 17 to 18 fathoms in Yankalilla Bay by Dr. Verco.

Tellina Vincentiana, *spec. nov.* Plate xi., fig. 10.

Shell small, thin, dirty-white, slightly inequivalve (the right valve more convex), considerably inequilateral, the anterior side longer, irregularly ovate, narrowed and pointed behind. Ornamented with close, short, erect lamellæ, becoming fewer and more elevated on the post-dorsal slope, distantly radiate-striated in the interstices; the lamellæ increase in number by bifurcation at about the middle of the valve, again to unite in pairs close to the front margin.

The front-dorsal margin is a very little convex, and only slightly oblique, the post-dorsal margin being almost rectilinear and very slanting; the ventral outline is broadly arcuate, more rapidly up-curving in front than behind, posteriorly it has a slight incurvation.

The umbones are small, acute, and a little elevated.

There are two cardinal teeth in each valve, one of which is bifid, and two well-developed lateral teeth in the right valve; the pallial sinus is wide, fused to the pallial line, and extends across the valve to near the adductor scar.

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Dimensions.—Antero-posterior, 15·5; umbo-ventral, 12; sectional diameters, 5·25 mm.

Locality.—St. Vincent-Gulf, in 17 to 18 fathoms (*Dr. Verco*).

This species is related to *T. languida*, E. A. Smith, but it has a lamelliform and not striated ornament. Mr. Brazier reports to me that "the species is quite new; it is smaller, and allied to *T. margaritina*, Lamarck, from King George Sound; it is a great deal smaller, and in miniature like *T. ostracea*, Lamarck, from India." The dentition of *T. Vincentiana* will not justify its inclusion in the subgenus *Fabulina*, to which Von Bertin refers *T. australis*, Desh., and *T. margaritina*, Lamarck.

Lucinopsis pellucida, *spec. nov.* Plate xi., fig. 2.

The shell, the diagnostic characters of which here follows, has an external resemblance to *Kellia rotunda* and *Diplodonta globularis*, more especially to the latter by reason of the external ligament. But the internal characters are proper to *Lucinopsis*, as determined by actual comparison with its type-species, *L. undata*.

The left valve has three cardinal teeth; the central tooth is vertical, triangular, and its summit medially excavated, appearing as if bifid; the anterior tooth is lamellar, short, and moderately divergent; the posterior tooth is longer, lamellar, and widely divergent; the anterior cardinal margin has a deep and wide groove.

The right valve has two divergent lamellar teeth, and the cardinal margin in front is furrowed.

The pallial sinus is large, rounded, and ascending, reaching to the middle line of the valve.

Shell rather globose, somewhat circular, and nearly equilateral; it is whitish, slightly glossy, and translucent, ornamented with fine concentric lines and folds of growth, and with delicate radial striæ on the posterior area.

Dimensions.—Antero-posterior, 12·5; umbo-ventral, 12; sectional diameters. 7·5.

Dredged in life (two examples) from 12 fathoms in Yankalilla Bay, St. Vincent-Gulf *(Dr. Verco)*.

Crassatella carnea, *spec. nov.* Plate xi., figs. 1, 1a.

Shell suborbicular, rather compressed, almost equilateral; the dorsal margin about equally sloping on both sides, a little arched in front, but rather straighter behind; anterior side rounded, post-ventral margin slightly obliquely truncated (more conspicuously so in young examples); ventral margin moderately curved.

Surface concentrically ribbed, the ribs attenuate laterally, and may or may not be developed to the ventral margin.

The colour is a pale yellow-brown with darker coloured blotches in the median area and before and behind the umbos; sometimes

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there are two interrupted brownish-coloured rays bounding the median area.

The interior is rose-tinted and the inner edge of the valves along the ventral margin is minutely crenulated.

Dimensions.—Antero-posterior diameter, 22; anterior radius, 10·5; posterior radius, 11·5; dorso-ventral diameter, 19.

Habitat.—Dredged in life from nine to fifteen fathoms in Yankalilla Bay, and off Rapid Head by Dr. Verco.

This species is very like *C. aurora* and *C. Banksii*, Adams and Angas, inhabiting Bass-Straits, with regard to colour, ornament and crenated margin of valves. It is, however, of a different form, is as widely removed from *C. aurora* as that species is from *C. Banksii*; thus *C. Banksii* is oblong-ovate, *C. aurora*, transversely ovate, and *C. carnea* is more rotund; they may eventually prove to be variations in shape of an aggregate species.

The proportion of length to the height in *C. carnea* is 14 to 12, and in *C. aurora* it is 15 to 11.

Pectunculus sordidus, *spec. nov.* Plate xi., fig. 8.

Shell solid, triangularly ovate, moderately convex or slightly depressed, cardinal area short and narrow, somewhat angulated posteriorly, the post-dorsal region impressedly flattened and narrow.

Surface radiately ridged; ridges 20, broad, subangulated, not prominently elevated, separated by linear furrows; there are five faint ribs on the post-dorsal area; the whole surface crossed by close and fine concentric striæ.

Colour sordid-white, with a few minute chesnut spots about the umbones, and blotches of the same colour about the hinge-line. Interior white, with a faint chesnut-tinge about the post-adductor impression. Inner margin strongly crenated.

Dimensions.—Antero-posterior, 20; umbo-ventral, 18; sectional diameters, 10·5 mm.

Dredged in life (one example), from 9 to 11 fathoms, off Rapid Head, St. Vincent-Gulf (*Dr. Verco*).

It has not the shape of *P. Gealei* of the same size, but the general style of ornament is the same; though the ribs of the present shell are more depressed and angular, there is no defined interstitial furrow, and the concentric ornament is finer.

Leda Verconi, *spec. nov.* Plate xi., fig. 4.

Shell elongate-ovate, moderately compressed, subequilateral; concentrically lirate; covered with a greenish-gray glossy epidermis.

The dorsal margins are equally sloping, the front one a little convex, the posterior slightly concave; the posterior side is

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shortly acuminated; a slightly-curved keel defines the dorsal area, which is striated and moderately impressed; the lunule is very narrow and defined.

The concentric liræ are regular, about 30, stout, elevated, and compressedly-rounded, separated by a little wider, flat furrows; they are slightly incurved as they approach the anterior margin, and more conspicuously so towards the posterior keel, though there is no appearance of a second keel.

Dimensions.—Antero-posterior, 8; umbo-ventral, 5; sectional diameters, 3·5 mm.

Numerous examples dredged in life by Dr. Verco (after whom the species is named) in Yankalilla Bay; also in shell-sand, Holdfast Bay (*R. T.*).

This is not the young of *L. crassa*, which at the same size has a well-pronounced second keel defining the rostral area. It makes an approach to *L. Dohrni*, Hanley, but has not so straight a hinge-line, and is more convex.

A Second Supplement to a List of the Lamellibranch and Palliobranch Mollusca of South Australia.

By Professor Ralph Tate, F.L.S., F.G.S.

[Read September 8, 1891.]

Chiefly through the dredging operations conducted by Dr. Verco during the past summer several additions have been made to the Lamellibranch-fauna of South Australian waters; several of these are of extreme interest, and I am constrained to found no less than six new species, which are described in the preceding pages.

Addenda and corrigenda to previously recorded species are placed within brackets.

Thracia speciosa, *Angas*, Proc. Zool. Soc., 1869, t. 2, fig. 12, p. 48.

Compared with *T. modesta*, this species is oblong and more inequilateral.

A left valve, dredged at 12 fathoms in Yankalilla Bay by Dr. Verco, agrees fairly well with Angas' figure of his *T. speciosa*, though its anterior side is longer, and the height is slightly less. Length, 19·5 mm.; height, 10·5.

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Hemimactra cretacea, *Angas.*

Ref.—Spisula cretacea, Angas, Proc. Zool. Soc., 1867, t. 44, fig. 6.

Closely resembles *Anapa triquetra*, but differs generically and particularly by the lateral teeth being striated.

Dead shells, Encounter Bay *(Adcock)* and Aldinga Bay *(Kimber)*. The identification is based on the comparison with authentic specimens from the locality of the type.

[**Lutraria oblonga,** *Gmelin.*

Mr. G. B. Sowerby in Journal of Conchology, October, 1889, p. 155, writes that "This species, under various names, seems to range from the west coast of Ireland eastward to the Philippine Islands, and southward to the Cape. It is taken for granted by most authors that those found in Australian and Indo-Pacific waters must be specifically distinct from the European, but I can find no reliable character by which to distinguish them."

After a careful study of numerous examples of our Lutrariæ and comparison with authentic specimens of *L. oblonga*, I concur with Mr. Sowerby's views, and express the opinion that one species only exists in our waters; therefore the names *L. rhynchæna* and *L. dissimilis* must be relegated to the long catalogue of synonyms under *L. oblonga*. Menke in Moll. Nov. Hollandiæ, p. 46, 1843, would seem to have been the first to identify an Australian Lutraria with the European species, as he records *L. solenoides*, Lamarck, (a recognized synonym of *L. oblonga*) from the west coast of Australia).]

Semele monilis, *Tate, antea*, p. 261.

Aldinga, Moonta, and Yankalilla Bays.

Tellina Vincentiana, *Tate, antea*, p. 262.

Off Rapid Head and Myoponga, and Yankalilla Bay in St. Vincent-Gulf.

[**Tellina modestina,** *Tate, nom. mut.*

Tellina modesta, Sowerby, 1883; non Carpenter *(Angulus modesta)*, Proc. Acad. Nat. Sc. Philadelphia, p. 56, 1865; *T. modesta* (Carp.), Bertin, Nouv. Arch. du Mus., 1878, p. 274.]

Lucinopsis pellucida, *Tate, antea*, p. 263.

Yankalilla Bay, St. Vincent-Gulf.

Chione striatissima, *Sowerby.*

Ref.—Venus striatissima, Sowerby, Thes. Conch., p. 718, t. 157, figs. 103-105; *id.*, Reeve, Conch. Icon., t. 26, f. 135, 1864; *Chione striatissima*, Deshayes.

This species, which is not uncommon in St. Vincent-Gulf and

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Encounter Bay, ranging from 10 to 25 fathoms, and not rare as a beach-shell, has been incorrectly referred by me as the young of *C. gallinula*, whereas, at the time, I did not actually know juvenile states of that species.

[Kellia rotunda, *Deshayes.*

An examination of living examples proves the presence of a broad and short respiratory canal, proper to *Kellia*. Mr. Adcock reports to me that the species inhabits the interior of freshly-deserted egg-cases of sharks; often many examples, from the state of fry to that of the adult, occur, clinging by byssal threads to the surface of the egg-case. Woodward says that *Kelliæ* creep about freely, and fix themselves by a byssus at pleasure.]

[Genus Ephippodonta.

My description of the animal of *E. McDougalli* proves on examination of less distorted specimens (in spirit) to be incorrect. The mantle-lobes are united, except for a length of about one-third of the animal, at the anterior medial line. The mantle has, however, a narrow marginal reflection coincident with the shell-border; the marginal reflections of each lobe imbricate before and behind, they are papillary externally and shortly ciliate-fringed on the edge. The inner pair of gills are very large and tumidly swollen, they are united behind. The adductor muscles are in near proximity to the hinge-line.

Through the slit of the united mantle-lobes a pointed cylindrical foot and the thickened margins of the inner gills are partially protruded; or the latter, when concealed, produce large swellings of the mantle, these I mistook for a creeping disk.

These characters bring the genus in close relation to *Scintilla*.]

Crassatella carnea, *Tate, antea*, p. 263.

Yankalilla Bay and to north of Rapid Bay *(Dr. Verco)*.

Unio Novæ-Hollandiæ, *Gray.*

Ref.—Proc. Zool. Soc., 1834, p. 57.

Unio cucumoides, Lea, 1840, and Obs., vol. III., p. 30, t. 7, fig. 2, 1843; *id.* Reeve, Conch. Icon., 1868, t. 20, fig. 89.

A black, elongate, narrow, very plicate shell, attenuated and narrowly truncated posteriorly.

Length, 3½ inches; breadth, 1¼ inch.

Lagoon near Alice Springs (coll. Mr. Adcock).

The identification is based on Reeve's figure of *U. cucumoides*, though the specimen wants the diversely radiating wrinkled-warts on the posterior side, as described by Gray and Reeve. Smith positively affirms the identity of this species and *U. cucum-*

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oides, and is therefore known from the Macquarie, Hunter, and Richmond Rivers.

[**Carditella subtrigona**, *Tate*.

Many living examples of this species were dredged by Dr. Verco in Yankalilla Bay. The shell is covered with a thin epidermis of a pale-horn colour, varied with a more or less diffused flesh-tint. The largest examples have the following dimensions:—Antero-posterior, 7·75; umbo-ventral, 7; and sectional diameters, 5.]

Cardita Gunni, *Deshayes*.

Proc. Zool. Soc., 1852, p. 101; *C. Atkinsoni*, Ten.-Woods.

A suborbicular cordate shell, with from 17 to 19 nodosely squamose ribs about as wide as the furrows. Long., 13; lat., 12 mm.

In deep water off Kangaroo Island; Yankalilla Bay; Encounter Bay; also Tasmania.

Leda Verconis, *Tate*, *antea*, p. 264.

Yankalilla Bay; Holdfast Bay.

Pectunculus sordidus, *Tate*, *antea*, p. 264.

Off Rapid Head, St. Vincent-Gulf.

[**Pectunculus Gealei**, *Angas*.

Proc. Zool. Soc., 1873. t. 20, fig. 5, p. 183.

P. flabellatus, Ten.-Woods, Trans. Roy. Soc., Vict., 1878, p. 61.

P. laticostatus, Angas, P.Z.S., 1878, p. 871.

P. orbicularis, Angas, P.Z.S., 1879, t. 35, fig. 9, p. 420.

P. Beddomei, E. A. Smith, Lamell. Challenger Ex., 1885, p. 255, t. 18, figs. 1-1*b*.

There is no doubt that *P. flabellatus* and *P. Beddomei* are the same, though Woods' diagnosis is not satisfactory; however, the excellent figure of *P. Gealei* (a New South Wales shell) permits one to refer, without hesitation, the species of Woods and Smith to it. *P. orbicularis*, described from a Bass-Straits shell, represents a young stage of the same species, which is remarkable for its long straight hinge-line.]

Modiola arborescens, *Chemnitz*.

Mytilus arborescens, Chemnitz, Conch. Cab., vol. 2, t. 198, f. 2016-17.

Modiola arborescens, Reeve, Con. Icon., t. 6, f. 30 (1857).

Modiola picta, Lamarck, An. S. Vert., vol. VI., p. 112 (1819); id. Sowerby, Genera of Shells, fig. 1.

A compressedly-convex cylindrically-oblong shell, white under a pale-yellow highly glossy epidermis, the posterior slope divaricately netted with fine purplish lines.

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One valve dredged off Troubridge by Mr. E. H. Matthews; several living specimens and detached valves dredged at 14 to 17 fathoms in Yankalilla Bay by Dr. Verco. The largest example measures 30 mm. long by 12 mm. broad.

The habitat of the species was unknown to Lamarck, but he gives Atlantic Ocean with a doubt, Deshayes in 1836 simply repeats him. Reeve refers the species to the West Indies.

This beautiful mussel is, however, recorded by Tenison-Woods, Proc. Roy. Soc., Tasmania, as very rare in Long Bay, Tasmania, and of about 45 mm. long. The South Australian examples are much smaller, but otherwise are comparable with Reeve's figure. Mr. John Brazier writes me, "I dredged *Modiola arborescens* outside Sydney Heads, some 17 years ago, in 45 fathoms, also inside Port Jackson in 18 fathoms."

Terebratula Wyvillei, *Davidson.*

Ref.—Challenger Brach., t. 2, fig. 7-8; id. Trans. Lin. Soc., 1886, t. 2, f. 8-14.

Off South Australia, lat. 42° 42′, long. 134° 10′, depth 2,600 fathoms.

Also Chili, Patagonia, and Falkland Islands.

EXPLANATION TO PLATE XI.

Fig.
1-1a. Crassatella carnea. Slightly enlarged.
2. Lucinopis pellucida. 2 x.
3. Latirofusus nigrofuscus. 2 x.
4. Leda Verconis. 3 x.
5. Leiopyrga octona. 3 x.
6. Siphonalia oligostira. Nat. size.
7-7a. Semele monilis. Nat. size, and magnified portion.
8. Pectunculus sordidus. 2 x.
9. Diala magna. 3 x.
10. Tellina Vincentiana. 2 x.

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A Bibliography and Revised List of the Described Echinoids of the Australian Eocene, with Descriptions of some New Species.

By Professor Ralph Tate, F.L.S., F.G.S., &c.

[Read October 6, 1891.]

I.—BIBLIOGRAPHY OF THE EOCENE ECHINOIDS OF AUSTRALIA.

1834. Sturt, "Two Expeditions in the Interior of Southern Australia," gives drawings of three Echinoids from the Eocene calciferous sandstone of the River Murray Cliffs, which can very safely be referred to familiar species known to occur there:—*Spatangus Hoffmanni*, Goldfuss, t. 3, f. 10, is *Lovenia Forbesi; Scutella*, sp., t. 3, f. 9, represents the underside of *Monostychia australis;* whilst the *Echinus*, t. 3, f. 11, is unrecognizable, but may be *Psammechinus Woodsi* or *Paradoxechus novus*, more probably the latter.

1862. Rev. J. E. Tenison-Woods, "Geological Observations in S. Aust.," copies the figures of Sturt's *Echinoids*, calling the *Spatangus S. Forbesii*, and adds two figures of an *Echinolampas* from Mount Gambier.

1864. Dr. Duncan, "Annals and Mag. Nat. Hist.," p. 165, figures *Hemipatagus Forbesi*, and records *Clypeaster folium*, Ag., but which is now recognised as *Monostychia australis*, Laube, and not the species of Agassiz.

1867. Rev. J. E. Tenison-Woods, "Trans. Adelaide Phil. Soc.,' illustrates:—*Echinolampas Gambierensis*, n. sp., figs. 1*a*-1*c*; *Hemipatagus Forbesi*, (Woods and Duncan), figs. 3*a*-3*d*; and *Hemiaster Archeri*, n. sp., figs. 2*a*-2*d*. The last is the *Echinolampas* figured in his "Geol. Observations."

1869. Dr. G. C. Laube, "Sitz. d. K. Akad. d. Wissenchaft. Wien," vol. LIX., p. 193, describes the following species from the River Murray Cliffs:—*Psammechinus Woodsi*, n. sp.; *Paradoxechinus novus*, n. sp.; *Monostychia australis*, n. sp.; *Catopygus elegans*, n. sp.; *Echinolampas ovulum*, n. sp.; *Micraster brevistella*, n. sp.; *Eupatagus Murrayensis*, n. sp.; *E. Wrighti*, n. sp.; and *Hemipatagus Forbesi*, Tenison-Woods. I have no hesitation in

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referring the *Echinolampas* to *E. Gambierensis* and the *Micraster* to *M. Archeri*, T.-Woods *(Hemiaster)*.

1875. R. Etheridge, jun., "Quarterly Journal Geological Society," vol. XXXI., p. 444 *et seq.*, gives a list of the Tertiary Echinodermata of Australia, describes *Hemipatagus Woodsii*, n. sp., and illustrates some details of structure in respect of *Psammechinus Woodsii* and *Micraster brevistella* not shown in Laube's drawings.

1876. Prof. Duncan, "Quarterly Journal Geological Society," vol. XXXIII., describes *Leiocidaris australiæ*, *Temnechinus lineatus*, *Arachnoides Loveni*, *A. elongatus*, *Rhynchopygus dysasteroides*, *Echinobrissus australiæ*, *Holaster australiæ*, *Maretia anomala*, *Eupatagus rotundus*, *E. Laubei*, and *Megalaster compressus* as new species, *Megalaster* as a new genus. In addition there are "Supplementary Notes" on previously-described species, and the following exoteric species are recorded:—*Pygorhynchus Vassali*, Wright; *Schizaster ventricosus*, Gray; *Echinarchnius parma*, Gray; *Echinanthus testudinarius*, Gray.

1877. Prof. Tate, "Quarterly Journal Geological Society," vol. XXXIII., p. 257, fig. 2, describes *Salenia tertiaria*, n. sp., from Aldinga Cliffs, and records 15 genera additional to the echinodermal fauna of the Australian Tertiary.

1877. R. M. Johnston, "Proc. Roy. Soc., Tasmania," p. 116, records from the Eocene of Table Cape, Tasmania, *Micraster brevistella*, Laube, *Hemipatagus Woodsii*, Etheridge, and *Micraster Etheridgei*, n. sp. The author says of the last that the dorsal surface is very imperfectly preserved, but in his "Geol. of Tasmania," p. 231 (1888), it appears as *Monostychia Etheridgei*. It will serve no useful purpose to retain Mr. Johnston's species, as it is insufficiently diagnosed to permit of a safe generic interpretation, and the absence of a figure makes its attachment to known species a most hazardous venture.

1879. Prof. McCoy, "Prodromus Palæontology of Victoria," Decade VI., figures and describes *Lovenia Forbesi* and *Monostychia australis*.

1882. Prof. McCoy, "Prodr. Pal. Victoria," Dec. VII., figures three new species of *Pericosmus*, and believes that *Megalaster compressus* may be the same as his *P. compressus*, on which the fascioles have been obliterated.

1884. Prof. Tate, "Trans. Roy. Soc., S. Aust.," pp. 37 *et* 41, gives a list of the Echinodermata of the River Murray

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Cliffs, and indicates the identity of *Echinolampas ovulum* and E. *Gambierensis*.

1885. Prof. Tate, "Southern Science Record," Janry., p. 4, describes *Fibularia gregata*, n. sp., and *Linthia antiaustralis*, n. sp.

1887, Prof. Duncan, "Quart. Journ. Geol. Soc.," vol. XLIII., p. 411 *et seq.*, gives a list of species of the Echinoidea of the Australian Tertiaries, which is essentially the same as his former one published in 1877, as the only additional species admitted are *Salenia tertiaria* and McCoy's three species of *Pericosmus*. However, a revision is made of the specific characters of some species; a new genus *Ortholophus* is erected for his *Temnechinus lineatus; Rhynchopygus dyasteroides* is altered to *Holaster difficilis;* but *Megalaster* is retained, as is also *Clypeaster folium*, Ag., but as a variety; of living species *Echinarchinus parma* is dropped out, but *Schizaster ventricosus* is retained on an imperfect specimen.

1888. Prof. Tate, "Proc. Roy. Soc., New South Wales," p. 240 et seq., gives a list of genera of Echinoids, and the number of species to each from the Older Tertiary of Australia, amounting to 29 genera and 49 species. The following emendations have arisen:—*Temnechinus* includes *Paradoxechinus* and *Ortholophus; Murravechinus* (n. gen.) is a *Cœlopleurus; Arachnoides* is *Monostychia*, but the genus *Arachnoides* will stand, as a species has since been found in the Miocene at the Gippsland Lakes; *Cardiaster* is to be added, though inadvertently omitted, it was included in his list of 1877; *Rhynchopygus* should be expunged.

1889. Prof. Duncan, "Journ. Linnean Society, London," in a revision of the Genera of the Echinoidea, makes special reference to a few of our Tertiary species; but persists in the retention of his genus *Megalaster*.

1890. A. C. Gregory, "Geological Magazine," has anticipated me by describing several new species, some belonging to genera not hitherto known to form part of the Echinodermal fauna of the Australian Tertiary, except through their introduction in my lists of genera published in 1877 and 1888; *e.g.*, *Hemiaster*, *Cardiaster*, and *Cassidulus*. All of them have been distributed to various public museums with M.S. names, which are added as synonyms in the appended "List of Described Species" for the information of those to whom they have been sent.

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Table of Genera, showing their Geological Range.

The Echinoids of the Eocene of Australia belong to the following 28 genera, the geological range of which is indicated. From an analysis of their distribution in time, it may safely be concluded that this Echinoid fauna is Eocene, rendered more pronounced by the survival of a few Cretaceous genera. The sign * denotes that the genus is restricted to the Australian region for the geologic age indicated.

	Trias.	Jurassic.	Cretaceous.	Eocene.	Miocene.	Recent.
Cidaris ...	x	x	x	x†	x	x
Salenia ...	.	.	x	x	.	x
Cœlopleurus	.	.	.	x	x	x
Paradoxechinus	.	.	.	*	.	.
Ortholophus	.	.	.	*	.	.
Psammechinus	.	.	x	x†	x	x
Scutellina	.	.	.	x	.	.
Fibularia	.	.	.	x	x	x
Clypeaster	.	.	.	x	x	x
Monostychia	.	.	.	*†	.	.
Laganum	.	.	.	x	x	x
Echinobrissus	.	x	x	x†	.	.
Cassidulus	.	.	x	x	.	.
Pygorhynchus	.	.	x	x	x	.
Studeria	.	.	.	x	.	x
Echinolampas	.	.	.	x†	x	x
Holaster	.	.	x	*†	.	.
Cardiaster	.	.	x	*†	.	.
Hemiaster	.	.	x	x	x	x
Pericosmus	.	.	?	x†	.	.
Linthia ...	.	.	x	x	?	x
Schizaster	.	.	.	x†	x	x
Micraster	.	.	x	x†	.	.
Brissus ...	.	.	.	x	x	x
Toxobrissus	.	.	.	x	x	.
Maretia	.	.	.	x	x	x
Eupatagus	.	.	.	x†	x	x
Lovenia ...	.	.	.	x†	x	x

The number of described species admitted is 35; but the collection in the University Museum contains about 20 species of recorded genera which yet remain undiagnosed. In the following catalogue of described species the locality-names printed in capitals are those yielding the type-examples. The list of localities is very incomplete, as I have not consulted with my various correspondents, and those additional to the original ones are supplied from my own personal knowledge.

† Also in New Zealand.

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II.—LIST OF DESCRIBED SPECIES.

FAMILY CIDARIDÆ.

Genus Cidaris, *Leske*, 1778.

Subgenus Leiocidaris, *Desor*.

1. Leiocidaris australiæ, Duncan, Q. J. G. S. vol. XXXIII., p. 45, t. 3, f. 1, 2, 1877.

Localities.—Cape Otway, Aldinga Cliffs, R. Murray Cliffs, and generally in all fossiliferous strata of Eocene age.

FAMILY SALENIIDÆ.

Genus Salenia, *Gray*, 1835.

2. Salenia tertiaria, Tate, Q. J. G. S. vol. XXXIII., p. 256, figs. 2*a*-2*c*, 1877; *id*, Duncan, Ann. and Mag. Nat. Hist., 1878, vol. II., p. 61; A. Agassiz, Challenger Echini, p. 51 (1881).

Localities.—Aldinga Cliffs; Wilson Bluff, Gt. Aust. Bight.

3. Salenia globosa, Tate, see post.

Locality.—Aldinga Cliffs.

FAMILY ARBACIDÆ.

Genus Cœlopleurus, *Agassiz*, 1840.

4. Cœlopleurus paucituberculatus, Gregory, Geol. Mag., 1890, p. 486, t. 14, figs. 4-5. *Murravechinus spinosus*, Tate, ms.

Locality.—River Murray Cliffs, near Blanchetown.

FAMILY TEMNOPLEURIDÆ.

Genus Paradoxechinus, *Laube*, 1869.

5. Paradoxechinus novus, Laube, Akad. d. Wissensch. Wien, 1869, figs. 2-23.

Localities.—R. Murray Cliffs at Mannum; Aldinga Cliffs.

Genus Orthologhus, *Duncan*, 1887.

6. Orthologhus lineatus, Duncan, Q. J. G. S., vol. XLIII., p. 415, 1887. *Temnechinus lineatus*, Duncan, Q. J. G. S., vol. XXXIII., p. 46, t. 3, figs. 3-5.

Locality.—Mordialloc, Vict.

FAMILY ECHINIDÆ.

Genus Echinus, *Linnæus*.

Subgenus Psammechinus, *Agassiz*, 1846.

7. Psammechinus Woodsi, Laube, Akad. d. Wiss. Wien, 1869, figs. 1-1*b*; *id*, Etheridge, Q. J. G. S., vol. XXXI., t. 21, fig. 10, 1875; Duncan, Q. J. G. S., vol. XXXIII., p. 64.

Localities.—River Murray Cliffs, *(Laube, R. T.)*, Aldinga Cliffs.

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FAMILY FIBULARIIDÆ.

GENUS FIBULARIA, *Lamarck*, 1816.

8. FIBULARIA GREGATA, Tate, Southern Science Record, January, 1885, p. 4.

Localities.—Eocene, RIVER MURRAY CLIFFS at Mannum; Aldinga Cliffs; Surveyors' Point and Muloowurtie, Yorke-Peninsula; banks of the River Bremer, below Callington. All in South Australia.

GENUS SCUTELLINA, *Agassiz*, 1841.

9. SCUTELLINA PATELLA, Tate, see post.

Localities.—RIVER MURRAY CLIFFS; Mount Gambier; Muddy Creek.

FAMILY CLYPEASTRIDÆ.

GENUS CLYPEASTER, *Lamarck*, 1816.

10. CLYPEASTER GIPPSLANDICUS, McCoy, Prod. Pal. Victoria, Dec. VI., 1879 t. 49. *Echinanthus testudinarius* (Gray), Duncan, Q. J. G. S., vol. XXXIII., p. 46, 1877.

Localities.—MITCHELL RIVER, near Bairnsdale *(McCoy, R. T.,* &c.); River Murray Cliffs *(R.T.)*; Spring Creek, near Geelong, *(R. T.)*; Corio Bay; Muddy Creek; Mordialloc *(McCoy, R. T.,* &c.),

GENUS MONOSTYCHIA, *Laube*, 1869.

11. MONOSTYCHIA AUSTRALIS, Laube, Akad. d. Wiss. Wien., 1869, p. 190, figs. 3-3c. *Clypeaster folium* (Agassiz), Duncan, 1864. *Arachnoides australis*, Duncan, Q. J. G. S., 1877, p. 48. *Monostychia australis*, McCoy, Prod. Pal. Victoria, Dec. VI., 1879, t. 50, figs. 5-7. *Clypeaster (Monostychia) australis*, Duncan, Q. J. G. S., 1877, p. 420. Varieties, *Arachnoides Loveni*, Duncan, Q. J. G. S., 1877, p. 47, t. 3, figs. 6-7; *Arachnoides elongatus*, Duncan, *id.*, p. 48, t. 3, fig. 8.

Localities.—RIVER MURRAY CLIFFS, *(Laube, McCoy, R. T.,* &c.); Mount Gambier limestone *(T. Woods);* Mordialloc *(Duncan, McCoy.)*

FAMILY CASSIDULIDÆ.

GENUS CASSIDULUS, *Lamarck*, 1801.

12. CASSIDULUS LONGIANUS, Gregory, Geol. Mag. 1890, p. 482, t. 13, figs. 1-3. *Cassidulus australis*, Tate ms.

Localities.—In the glauconitic limestone, ALDINGA CLIFFS; limestone, Roll's Point, Kingscote, Kangaroo Island.

GENUS PYGORHYNCHUS, *Agassiz*, 1839.

13. PYGORHYNCHUS VASSALI, Wright, Q. J. G. S. vol. XX., t. 22, figs. 6a-6c (1864); Duncan *id.*, vol. XXXIII., p. 51.

Localities.—East of the GLENELG RIVER; Mannum, River Murray.

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GENUS CATOPYGUS, *Agassiz*, 1836.

SUBGENUS STUDERIA, *Duncan*, 1889.

14. CATOPYGUS (Studeria) ELEGANS, Laube. *C. elegans*, Laube, Akad. d. Wiss. Wien., 1869, figs. 8-8c., p. 10.
Locality.—RIVER MURRAY CLIFFS at Mannum.

GENUS ECHINOLAMPAS, *Gray*, 1825.

15. ECHINOLAMPAS GAMBIERENSIS, Tenison-Woods, Proc. Adelaide Phil. Soc., 1867, figs. 1*a*-1*c*; Tate, Trans. Roy. Soc., South Australia, 1884, p. 37. *Echinolampas ovulum*, Laube, Akad. d. Wiss. Wien., 1869, p. 191; Duncan Q. J. G. S., vol. XXXIII., p. 66, 1877; vol. XLIII., p. 420; Gregory, Geol. Mag., 1890, t. 13, figs. 7-8, p. 483.
Localities.—River Murray Cliffs *(Sturt, Laube, R. T.)*; MOUNT GAMBIER LIMESTONE *(T. Woods)*; Mitchell River, Bairnsdale *(Gregory)*.

16. ECHINOLAMPAS POSTEROCRASSUS, Gregory, Geol. Mag., 1890, t. 13, figs. 4-6, p. 483. *E. Gambierensis*, pars. Tate ms.
Locality.—Glauconitic limestone, ALDINGA CLIFFS.

GENUS ECHINOBRISSUS, *Breyn.*, 1732.

17. ECHINOBRISSUS AUSTRALIÆ, Duncan, Q. J. G. S., vol. XXXIII., pp. 50, 66, t. 3, fig. 11, 1877.
Locality.—CAPE OTWAY.

18. ECHINOBRISSUS VINCENTINUS, Tate, see post.
Localities.—ALDINGA BAY and near Ardrossan.

FAMILY ANANCHYTIDÆ.

GENUS HOLASTER, *Agassiz*, 1840.

19. HOLASTER AUSTRALIÆ, Duncan, Q. J. G. S., vol. XXXIII., p. 51, t. 3, figs. 12, 13, 1877; *id*, Q. J. G. S., 1887, p. 420, wdct. *Rhynchopygus dysasteroides*, Duncan, Q. J. G. S., 1877, p. 49, t. 3, figs. 9-10. *Holaster difficilis*, Duncan, Q. J. G. S., vol. XLIII., 1887, p. 421.
Localities.—Castle Cove, CAPE OTWAY; River Murray Cliffs; mouth of the R. Onkaparinga; Mount Gambier; west side of St. Vincent-Gulf.

Specimens comparable with Duncan's figures, obtained from a soft polyzoal limestone at the mouth of the Onkaparinga, have a fairly well-defined suranal fasciole. The species is very variable in shape, some examples are more depressed than the type, whilst in the opposite direction others are moderately elevated like *H. Trecensis*, Leymerie; and a few examples are subconic with a proportion of the long diameter to the height of three to two.

Duncan admits that *Rhynchopygus dysasteroides* is a crushed *Holaster*, and it would have been well if he had added—and

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probably of *H. australiæ*, with some specimens of which it agrees in outline.

GENUS CARDIASTER, *Forbes*, 1852.

20. CARDIASTER TERTIARIUS, *Gregory*, Geol. Mag., 1890, t. 14, figs. 2-3, p. 484.

Locality.—Glauconitic limestone, ALDINGA CLIFFS.

The good state of preservation of many of my specimens permits me to state that there is no lateral fasciole.

21. CARDIASTER LATECORDATUS, Tate, see post.

Locality.—Glauconitic limestone, Aldinga Cliffs.

FAMILY SPATANGIDÆ.

GENUS HEMIASTER, *Desor.*, 1857.

22. HEMIASTER PLANEDECLIVIS, Gregory, Geol. Mag. 1890, t. 14, figs. 6-7, p. 488. *H. latifrons*, Tate, ms.

Localities.—RIVER MURRAY CLIFFS; glauconitic limestone; Aldinga Cliffs.

GENUS PERICOSMUS, *Agassiz*, 1847.

23. PERICOSMUS COMPRESSUS, McCoy, Prod. Pal. Victoria, Dec. VII., 1882, t. 67, f. 2, t. 68. *Megalaster compressus*, Duncan, Q. J. G. S., 1877, p. 62, wdct. *Pericosmus McCoyi*, Gregory, Geol. Mag., 1890, p. 485. *Megalaster compressus*, Duncan, P. L. S., 1889, p. 221.

Localities.—RIVER MURRAY CLIFFS *(Duncan, Tate)*; Spring Creek, near Geelong *(McCoy, R. T.)*.

24. PERICOSMUS GIGAS, McCoy, Prod. Pal. Victoria, Dec. VII., tabs. 64, 65.

Localities.—BANKS OF THE MURRAY, near junction with the Darling, and at Corio Bay, Port Phillip *(McCoy)*.

25. PERICOSMUS NELSONI, McCoy, Prod. Pal. Victoria, Dec. VII., t. 66, figs. 1-2, t. 67, fig. 1.

Locality.—WAURN PONDS, near Geelong.

GENUS LINTHIA, *Merian*, 1853.

26. LINTHIA ANTI-AUSTRALIS, Tate, Southern Science Record, January 1885.

Locality.—RIVER MURRAY CLIFFS, near Morgan.

GENUS SCHIZASTER, *Agassiz*, 1847.

27. SCHIZASTER ABDUCTUS, Tate, see post.

S. ventricosus (Agassiz), Duncan, Q. J. G. S., 1877, p. 61.

Localities.—RIVER MURRAY CLIFFS; Moorabool River, a cast (Mr. Sweet).

GENUS MICRASTER, *Agassiz*, 1840.

28. MICRASTER ARCHERI, Tenison Woods sp. *Echinolampas* sp. Tenison Woods, Geol. Obs., p. 77, wdcts., 1862. *Hemiaster*

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Archeri, Tenison Woods, Proc. Phil. Soc., Adelaide, 1887, figs. 2*a*-2*d*. *Micraster brevistella*, Laube, Akad. d. Wiss. Wien., 1867, p. 192, fig. 8; Etheridge, Q. J. G. S., vol. XXI., p. 447, figs. 11, 12, 1875.

This species has an ill-defined fasciole truncating the posterior ambulacra, and extending nearly to the anterior pair, and thus makes a passage to *Brissopsis*; on this account I quoted it as *Brissopsis Archeri*, in Trans. Roy. Soc., 1884, p. 41.

Localities.—River Murray Cliffs; Mount Gambier *(Ten. Woods)*; Table Cape *(Johnston)*.

Genus Maretia, *Gray*, 1855.

29. Maretia anomala, Duncan, Q. J. G. S., vol. XXXIII., p. 52, t. 4, figs. 1-4, 1877.

Locality.—Mouth of the Sherbrook River, Victoria.

Genus Eupatagus, *Agassiz*, 1847.

30. Eupatagus Wrighti, Laube, Akad. d. Wiss., Wien, p 195, fig. 18, 1867.

Locality.—River Murray Cliffs (*Laube, R. T.*).

31. Eupatagus Murrayensis, Laube, *op. cit.*, p. 196, fig. 4, 1867.

Locality.—River Murray Cliffs (*Laube, R. T.*).

32. Eupatagus rotundus, Duncan, Q. J. G. S., vol. XXXIII., p. 53, t. 3, figs. 14-17.

Locality.—River Murray Cliffs (*Laube, R. T.*).

33. Eupatagus Laubei, Duncan, *op. cit.*, p. 55, t. 3, fig. 18.

Locality.—Mouth of the Sherbrook River, Victoria.

34. Eupatagus decipiens, Tate, see post.

Pericosmus compressus, Gregory, Geol. Mag., 1890, t. 14, fig. 1.

Localities.—In a polyzoal rock at the Mouth of the River Onkaparinga; and in a calciferous sandstone, Aldinga Cliffs, south side of Port Willunga Jetty.

Genus Lovenia, *Agassiz* and *Desor*, 1847.

35. Lovenia Forbesi, Tenison-Woods. *Spatangus Hofmanni*, Sturt (non Goldfuss), Two Exped., 1834, t. 3, fig. 10. *Spatangus Forbesi*, Tenison-Woods, Geol. Observ., 1862, p. 75, wdct. *Hemipatagus Forbesi*, Duncan, Ann. Mag. Nat. His., 1864, t. 6, figs. 3*e-f*; Laube, Akad. d. Wiss., Wien, 1867, p. 193, figs. 4-4*b*. *Hemipatagus Woodsi*, Etheridge, Q. J. G. S., 1875, t. 21, figs. 1-7. *Lovenia Forbesi*, Duncan, Q. J. G. S., 1877, p. 56, t. 4, figs. 5-8; McCoy, Prod. Pal. Victoria, Dec. VI., t. 60, fig. 1-4, 1879.

Localities.—Generally distributed; in polyzoal limestone- and calciferous sandstone- formations of Eocene age, in South Australia, Victoria, and Tasmania.

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III.—DESCRIPTIONS OF NEW SPECIES.

Salenia globosa, *spec. nov.*

Test circular in outline, subglobose; apical system relatively small, hemispheric; vent excentric, irregularly pentagonal. Interambulacral tubercles large, seven in each vertical row; interambulacral zones comparatively wide, each at the ambitus about four times as wide as the ambulacrum in the same region.

Ambulacral zones with two outer rows of small secondary tubercles, between which are four oblique rows of smaller tubercles and some scattered granules. Pores in pairs, oblique; one pair to each ambulacral plate.

Peristome, smaller in extent than the apical system, with very shallow incisions.

Dimensions.—Height, 13·5; width, 18 mm.

Locality.—Glauconitic limestone, Aldinga Cliffs (2 exs.)

This second species of *Salenia* from our Tertiary is separable from *S. tertiaria* by its globose form and by having seven, in place of six, primary tubercles in each interambulacral row. Of the very many specimens of *S. tertiaria* which I have had under observation, I find no tendency to become conoid; it is, moreover, a much larger shell, the corresponding measures for *S. tertiaria* being 8·5 and 14, and 8 and 17·5. In shape this new species is exceedingly like the Cretaceous *S. gibba*, Agassiz, but is distinguished from it, among other characters, by having one pair of pores to each ambulacral plate, a character possessed by all Tertiary and the Recent species.

Scutellina patella, *spec. nov.*

Test large for the genus; subcircular to subdecagonal in outline; regularly conic.

Base regularly deeply-concave, the ambital margin tumid and narrowly defined abactinally.

Peristome central, nearly circular; moderately large; periproct supra-marginal, circular, very small as compared with the peristome.

Genital pores four; poriferous zones concealed beneath the ornament.

Interior with well-developed vertical partitions radiating towards the peristome.

Tubercles uniform, small, and perforate, rather wide apart, surrounded by scrobiculate ornament.

Dimensions of two examples:—Longitudinal diameter, 24, 22; transverse diameter, 22·5, 21; height, 7·5, 6.

Localities.—Calciferous sandstones of the River Murray Cliffs (common); white polyzoal limestone at Mount Gambier; polyzoal sands, Muddy Creek.

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By its supra-marginal periproct this new *Scutellina* is related to *S. supera*, Agassiz; but its circular outline and high summit distinguish it; it is, moreover, very much larger.

Echinobrissus Vincentinus, *spec. nov.*

Subconvex; ambitus ovate-subpentagonal, anteriorly rounded, sides arched to near the posterior border, which is roundly biangulated; base longitudinally concave, tumid mediolaterally. The anal sulcus is moderately deep, wide, rounded behind, and extends to more than half or nearly two-thirds the length of the post-apical radius. The apical disc is at about three-fifths of the long diameter from the front. The greatest width is in a plane intersecting the anal sulcus at its middle. The tuberculation is rather large, and largest on the actinal surface. There are no pores below the subpetaloid parts of the ambulacra, but pores in a single series occupy the ambulacra converging on the peristone.

Dimensions.—Longitudinal, 28·5; transverse, 23·; sectional diameters, 12· mm.

Localities. - Common in the glauconitic limestones, Aldinga Bay; also at Muloowurtie, near Ardrossan, York-Peninsula.

This species has the same general outline of *E. Morrisi*, Forbes, but is more depressed and has a very much wider sulcus, not narrow and acute behind. Another Cretaceous species which comes near to it, is *E. lacunosus*, Goldfuss, Petref. Germ., p. 141, t. 73, fig. 8, but it is more narrowed at the front, more angulated behind, the anal sulcus is much longer, and the apical system is more excentric. *E. Australiæ*, Duncan, has an elliptical outline.

Cardiaster latecordatus, *spec. nov.*

Test orbicular-cordate, as seen from above, with a deep and wide anterior groove, which is tumidly keeled at its sides, and extends from the vertex to the peristome; the base is slightly concave longitudinally, and flattened laterally; the ambitus is slightly tumid, and the abactinal surface is depressedly convex.

The apical system is excentric, and is a little posterior to the vertex.

From the vertex the surface slopes rapidly in all directions, most so to the posterior margin, which is slightly rostrated truncate; the posterior face is wide, but short, and is slightly concave vertically. The posterior slope is interrupted by a faint keel; and the anterior by the tumid keels bordering the anterior groove, transverse to which the anterior lateral areas are slightly concave. The anterior groove is very wide, but contracts a little at the ambitus, where it is deepest.

The ambulacra are flush, the anterior ambulacra slightly arched, are more prominent, the poriferous zones in each of the posterior ambulacra diverging more rapidly than those of the

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anterior pair. The interstitial ridges between the conjoined pores of the paired ambulacra are minutely granulated.

The test is minutely granular, and thickly studded with minute tubercles, which become conspicuous on the anterior interambulacra, more especially on the keels of the anterior groove.

Dimensions.—Longitudinal diameter, 82; transverse diameter at 30 mm. from the front, 87; height, 35 mm.; width of groove at ambitus, 11; in a medial position, 16 mm.

Locality.—Glauconitic limestone, Aldinga Cliffs (one ex.).

The conic abactinal surface distinguishes *C. latecordatus* from other depressed species of the genus, whilst its broadly cordate outline and large anterior groove are equally prominent characters.

Schizaster abductus, *spec. nov.*

Synonyms.—? *Schizaster ventricosus*, Duncan, Q. J. G. S., 1877, p. 61; *id*, 1887 (*non* Gray). ? *Schizaster exoletus*, Hutton, Cat. Tert. Echinod., New Zealand, 1873, p. 43.

Somewhat like *S. ventricosus*, but is proportionately broader and more depressed, has less-tumid sides, the posterior-median keel is less pronounced, and the outline is not so angular posteriorly. The dorsal slope rises regularly from before backwards, culminating in the posterior extremity of the projecting post-median keel, whilst the subanal area is broad and concavely depressed; characters so strikingly different from *S. ventricosus* as not to permit a confusion of the two species. The anterior petals are in broader and shallower grooves, which are less-arched at the apex, so that they are markedly divergent from the odd ambulacrum; whilst in *S. ventricosus* they are nearly parallel. The posterior petals are also less divergent than in *S. ventricosus*, and the odd ambulacrum is in a narrower and shallower furrow, which only slightly indents the ambitus. The vertex is, moreover, less excentric.

Comparative dimensions of the two species in millimetres:—

	Length.	Breadth.	Height.
S. ventricosus ...	42	35	33
S. abductus ...	58	55	34

Localities.—In the Eocene calciferous sandstone of the River Murray Cliffs, near Morgan (two perfect exs.); Moorabool River, near Geelong (Mr. Sweet, a cast).

Professor Duncan, *op. cit.*, has determined "a large specimen partly in the form of a cast from the Adelaide-district" to belong to the living *S. ventricosus*, but I am disposed to regard it as the present species which is the only one of the genus as yet found in the Australian Tertiary. Under these circumstances it would be unsafe to admit Prof. Duncan's identification on such imperfect material, and the name should be expunged from our

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list. The same author rejects *S. ventricosus* as Australian, whereas Gray's type is from West Australia, and the species is known from Southern Australian waters.

Professor Hutton, *op. cit.*, describes a *Schizaster* from the Oamaru formation under the name of *S. exoletus*. The type-specimen is before me, it is an imperfect cast, apparently of a *Schizaster*, and may be identical with the species from the River Murray Cliffs. The uncertainty of the identification makes it desirable to attach a different name to our fossil.

Eupatagus decipiens, *spec. nov.*

Synonyms.—Pericosmus compressus, Gregory, Geol. Mag., 1890, t. 14, fig. 1, p. 485 (non *Megalaster compressus*, Duncan; non *Pericosmus compressus*, McCoy).

There cannot be a doubt that *Megalaster* was founded on a *Pericosmus* of which the fascioles had been obliterated, this is not an unusual circumstance with specimens of *P. compressus* obtained from the raggy limestones at Mannum, on the River Murray, whilst, on the other hand, specimens of the same species from the soft calciferous sandstone near Blanchetown, 60 miles higher up the river, have the characteristic fascioles of the genus, well-displayed, such as are illustrated by McCoy in his figures of the species. *P. compressus*, McCoy, and *Megalaster compressus*, Duncan, are certainly the same species. Gregory considers, however, the two to be distinct, and refers to Duncan's species a fossil from the Aldinga Cliffs, whilst the Murravian species he calls *P. McCoyi*. He has, however, overlooked the fact that Duncan's type came from the Murray Cliffs. In other words, *Pericosmus compressus* of Gregory does not represent the Murravian fossil; indeed, it is generically different, being a *Eupatagus*. I have been long familiar with the species, which is represented in the University Museum by numerous well-preserved examples, and propose for it the name as cited above.

The presence of tubercles on the abactinal surface, though small for the genus, is alone sufficient to afford a clue to its right generic location. The excellent drawing and comparative characters given by Mr. Gregory make it unnecessary to furnish a formal diagnosis of the species. Its shape and the paucity and smallness of the abactinal tubercles afford the leading distinguishing characters of this large species of *Eupatagus*.

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Further Notes on the Habits and Anatomy of Notoryctes typhlops.

By E. C. Stirling, M.A., M.D., F.R.C.S., Eng., C.M.Z.S.,

Lecturer on Physiology in the University of Adelaide, Hon. Director of the South Australian Museum.

[Read October 6, 1891.]

Plate XII.

Mr. Bishop, of the Idracowra Station, to whom I have expressed myself indebted for many interesting facts concerning the habits of *Notoryctes typhlops*, has been good enough to supply me with further information on the subject since the date of our meeting in Central Australia in June, 1891.

It may be remembered that in my previous communication to this Society (vol. XIV., pt. 1) I mentioned that, up to the time of its publication, it had not been found possible in any case to keep a living specimen in captivity for more than a very short time. Shortly after our overland party had passed through the Idracowra country, however, Mr. Bishop was able, by careful management, to keep one alive and in good health for several weeks—indeed, so successful was he in meeting its requirements, that he expressed himself confident of being able to bring a living specimen to Adelaide. This, however, was unfortunately not to be, for in spite of all the care devoted to it, the little animal died before its owner could make his intended visit southwards. Nevertheless, the comparatively lengthened period of its captivity gave excellent opportunities for some careful observations, which are now recorded here.

From the contents of Mr. Bishop's letters to me, I compile the following statement by way of supplement to the particulars given in the paper referred to :—

Having had a living specimen brought to him on the 15th June, he kept it in a box of sand, in which was placed a tussock of porcupine grass *(Triodia irritans)*, so as to imitate its natural surroundings as nearly as possible. At the same time precautions against exposure to cold were taken by covering up the box with blankets, and the sand in the box was frequently changed, the fresh supply being first warmed and moistened. It was fed on the "witchety" previously referred to, two or three small

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grubs or a single large one being given daily. These it ate with such evident eagerness and avidity as to suggest that the animal was accustomed to that kind of food. Occasionally it was offered beetles of a species that is found under the porcupine clumps, but though these disappeared from the box, it is not certain that they were actually eaten. Ants, also, were tried with a previous specimen, but it seemed as if it was the *Notoryctes* which ran the risk of being eaten. Strong support is afforded to the suggestion that the "witchety" forms a part, at least, of its diet by the fact that, as previously observed, acacias are plentiful in the sandhills, which seem to be the natural haunt of the animal, and the larvæ in question are found in their roots at a depth of a foot or more. The suggestion is also confirmed by the statements of the natives and by the observations of Mr. Bishop himself, who found traces of underground burrowings around the stems of the acacia bushes. Still, it is not clear how the "witcheties," which are buried in the wood, are dislodged.

The aborigines declare that in the cold weather "oor-quámata no more walk about," and that they like damp sand, which confirms the statement previously made that they can only be found in warm weather after rain. Nevertheless, on one occasion two living specimens were placed, with the usual precautions, in a box containing two feet of damp sand, but they were found dead after the succeeding frosty night, though the box was well protected; the result being, in Mr. Bishop's opinion, due to the fact that there was not a sufficient depth of sand to enable them to get out of range of the effect of the frost, and he thus believes that in their wild state they must burrow to a considerable depth. With a winter experience of the climate in question, I do not think the frost, though undoubtedly sharp at times, could ever penetrate far below the surface of the ground.

When inspected in the box the oor-quámata would usually be found lying curled up in the sand, but not covered by it; and when the hand was put down immediately in front the little animal would climb into it and "claw it all over." It seemed quick of hearing, and always awakened immediately on lifting the lid of the box. A very slight whistling noise was sometimes made while the specimen, kept so long in captivity, was burrowing about in the box; but it was not certain whether this was a respiratory or a true voice sound; and a previous specimen was heard, when held, to make a faint chirping like that of a newly-hatched chick. None of the other specimens, however, emitted any sound that was audible.

Whenever the sand was changed by a fresh, warm, and moist supply the animal immediately commenced to burrow, and on warm sunny days, when it was let out in the open, it would, if the

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sand were hard, run a little way fairly quickly; but wherever the surface was soft it would begin burrowing directly, and, as soon as it had got a fair start, it progressed with great rapidity, though not so quickly as is suggested by a statement recorded in my previous paper.

I had specially commissioned Mr. Bishop to make all possible endeavor to secure a female with young, or at least to ascertain from the natives something about its breeding habits, but in spite of strenuous efforts he has not been able to acquire any information on the subject. Indeed none of the natives questioned had ever seen the young.

Incidentally it is mentioned that the depth of coloring and the darker markings about the hind quarters vary somewhat in different individuals, a fact which is confirmed by the examples received. I may further state that, in one or two of the more recent specimens, the lustre of the fur, especially about the belly and the rump, is so bright and so beautifully variable in tint, according to the incidence of light, as to invite the use of the term iridescent. The blacks also state that larger specimens than those found at Idracowra are met with further up the Finke watercourse.

I have received also a rough sketch of the tracks made by it in the sand, which conforms to the description already given.

In spite of the hopes, raised by this account of Mr. Bishop's successful management, that he would be able to bring this living specimen to Adelaide, we have been doomed to disappointment, for a letter received last month conveyed the disappointing news of its death. Having been uninterruptedly well during its captivity, it was found torpid and evidently ailing one morning after a heavy gale; it remained in this condition and died on the following day, after having endured a confinement lasting from the 15th June to 28th August, or a little over ten weeks. The animal seemed to maintain its condition throughout, and the only change in it observable was a decided increase in the length of the claws, which seemed to grow from disuse. This made its later movements more awkward than at first.

'I may add, with regret, that Mr. Bishop anticipated that the prevailing dry weather would prevent his being able to repeat his experiment before the date of his leaving Idracowra, about the end of October. I must again express my indebtedness to him for so many interesting and very carefully recorded facts.

The following observations were made from a specimen, 12·75 cm. long, that had been preserved in glycerine and spirit. An incision had been made through the walls of the abdomen to allow

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the entrance of the preservative fluid, but the viscera were not in a good condition for examination, either microscopic or macroscopic.

Female Organs of Reproduction.

Marsupium.—In my previous description of *Notoryctes* I reported that an examination of the specimens obtained on my transcontinental journey enabled me to establish the fact of the existence of a pouch in the female, thus confirming statements which had been made by my local informants, and verifying the somewhat uncertain conclusion to which the examination of the first imperfect specimen had led. A more careful investigation of the organ enables me now to supplement my previous remarks with additional particulars. As stated, the furthest anterior limit of the fundus of the pouch, which opens backwards, and readily admits a rod 5 mm. in diameter, is 15 mm. in front of the cloacal orifice, but its true depth, *i.e.*, the extent covered by the ventral wall, is 8 mm. Long sparse reddish hairs cover the greater part of the interior, with which are interspersed numerous grains of red sand, and from its mouth a shallow groove, as already mentioned, leads backwards to the cloacal aperture. The fundus is not, however, a simple rounded *cul-de-sac*, but extends laterally into two shallow bays or recesses, in each of which lies a bundle of stiff almost bristle-like hairs; these were either lying completely loose, or were so feebly attached that they came away on the slightest touch of the forceps. On the dorsal wall of the pouch, at the entrance of each of these small bays or recesses, and 2 mm. from its blind extremity, is a very slightly elevated oval, or nearly circular, mammary prominence, having a diameter of from 1 mm. to 1·5 mm., its surface being devoid of hair. A distance of 2 mm. separates these two mammæ. They are so small as to be scarcely visible without a hand lens, and only come into view when the pouch is completely laid open. Rising from a slight depression in the centre of the prominence is an exceedingly minute nipple-like projection, which, however, scarcely reaches beyond the general level of the surface of the mamma. The arrangement may be likened to that of a circumvallate papilla, with a shallow sulcus, or to a retracted human nipple in extreme miniature.

A series of microscopic sections proves conclusively that the prominence is the outward expression of a mammary gland, and that the minute papillary projection is a nipple. Some of the sections which have passed through the latter, vertically to its exposed surface, show three or four nearly straight and parallel ducts of exit, while in the tissues below is evidence of the existence of glandular alveoli, milk-tubules and ducts. Many large empty hair follicles are also seen in the sections, in connection with

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which are conspicuous sebaceous glands, but in no case was the hair itself *in situ*. I presume the long bristle-like hairs, mentioned above, belonged to these follicles, though I am unable to explain why they should have become loose (or wholly detached), while over the remaining surface of the pouch they should have remained firmly adherent.

Ovaries and Ligaments (Figs. 1, 2, and 3).—The ovaries (*ov*) are symmetrical, smooth, oval bodies, with the longer axis placed nearly longitudinally. Each lies in a well-marked pouch or recess constituted by the broad ligament (*ll*) which, sweeping across the pelvis, covers them loosely on their ventral, external, and partly on their posterior surfaces. Behind, the broad ligament passes to the neck and sides of the bladder, where it is lost; laterally, after covering the ventral surface of the oviducts, it extends to the sides and back of the pelvis, one prominent fold, which originates from the outer and hinder region of the ovary, constituting an ovario-pelvic ligament (Fig. 1, *op*). A longitudinal fold of peritoneum on each side, taking origin from the posterior parietes of the abdomen internal to the kidney, and partly also from the lower end of this organ, has its inner edge or margin slightly thickened to form an ovarian suspensory ligament (Fig. 1, *s.l*). On nearing the ovary its hinder end divides into two portions, one of which—the thicker and more distinct—is attached to the upper border of the ovary, and the other—more ventrally placed—to the oviduct near its commencement. Laterally and posteriorly this suspensory peritoneal fold is continuous with the pelvic inflection of the broad ligament as it passes from the ovaries to the sides and back of the pelvis. Springing from the peritoneum, which forms a loose investment for the rectum on its ventral and lateral surfaces, along a line so slightly oblique as to be almost median (Fig. 1, *a*), is a longitudinal fold or septum of peritoneum, having peculiar anterior connections (*b*) with a coil of intestine (*int*) not far from the pylorus, the exact extent and disposition of which requires further investigation. The ventral edge of this median longitudinal fold is attached to the posterior surface of the broad ligament in its middle line, as shown by the shaded line (*c*) in fig. 3, and, in fig. 1, by the faint streak which appears in the broad ligament as the downward continuation of the white line (*a*); this latter representing, as has been stated, the line of attachment to the rectal peritoneum. The disposition of the parts is somewhat similar to that which would obtain if, in a case of uterus bicornis in the human subject, the pouch of Douglas were longitudinally divided by a median septum passing from the peritoneum covering the rectum to the posterior (dorsal) surface of the broad ligament.

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In connection with the posterior end of the ovary are a few attenuated, fringed or hydatiform appendages, apparently the remains of vestigial structures.

Oviducts (Figs. 1, 2 and 3, *od*).—The oviducts, sinuous in their anterior or distal segments, lie close to, and follow the contour of, the outer borders of the ovaries. Each apparently commences at a point internal to the anterior border of the ovary, but neither with hand-lens nor microscope could I detect the actual opening; its tissues appeared to be merged insensibly into those of the broad ligament. About the level of the hinder border of the ovary the posterior segment of the oviduct dilates into what is evidently a uterine portion *(ut)*, with a smooth internal surface, but without any appreciable thickening of its parietes; microscopic sections, however, reveal the presence of glandular tubules. These uterine portions of the oviducts converge almost transversely, and meet at a point corresponding to about the middle of the base of the bladder (Fig. 3). After meeting, though the two cavities appear externally to unite into a single tube, they really run for a little distance side by side, separated by a thin septum, and then join the urethra close to the exit from the bladder. The small size and softness of the parts, as well as an unfortunately misdirected incision, prevented my being certain of the exact manner of junction, whether, in fact, previously to joining the urethra, the two uteri do actually unite, or whether they open separately into the uro-genital canal. I did not feel justified, however, in mutilating another specimen for the establishment of this fact alone.

Ureters (Figs. 1, 2 and 3, *ur*).—These pierce the wall of the bladder, and open on its internal surface, distinctly within its cavity, but close to the urethral orifice.

Urogenital Canal (Figs. 2 and 3, *s.ug*).—This is a long, straight, and, relatively, narrow canal, lying, along its whole length, ventral and close to the rectum (Fig. 2, *r*), into which it opens very obliquely by a relatively wide and funnel-shaped orifice situated at a distance of 6 mm. from the anterior margin of the external cloacal aperture.

Clitoris.—Partially concealed in a small depression in the anterior wall of the cloaca, 2 mm. posterior to the entrance of the urogenital canal, and about 4 mm. from the anterior margin of the cloacal orifice is a small lingulate and single-pointed clitoris.

Cloaca (Fig 2, *cl*).—The cloaca, 6 mm. in length along its anterior, and 10 mm. along its posterior wall, has its internal surface irregularly rugose, and is apparently capable of considerable distension. Compared with those of the rectum and intestines its parietes are thick. On each side of the cloaca towards its anterior surface is a conspicuous oval gland, from which a

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slender duct proceeding from its hinder end opens into the former by a minute papillary orifice.

Intestines.—The total length of intestine intervening between the pylorus and cloacal aperture is, when unravelled, 29 cm. Arranged in a few simple coils, and of relatively large calibre throughout, the anterior portion is of rather larger calibre than that of the posterior, having on an average a diameter of 5 cm. as against 3·5 cm. to which it diminishes at the point where it is shown as divided in fig. 1, *r*. It is slightly sacculated throughout, rather more so in the anterior than the posterior segment, but there is no marked external indication of a division between parts corresponding to large and small intestines; though, in the interior, an indistinctly marked valve-like projection, situated at a point about 10 cm. from the cloacal orifice, *may* indicate a delimitation; and a sacculation immediately succeeding this, rather more conspicuous than those elsewhere, may indicate a cæcum, but in both respects the observations are of very uncertain value. The mucous membrane throughout its whole length is soft and macerated, and is completely separated, forming an internal cast of the tube, which makes it impossible to distinguish the microscopical details.

Food.—The recognisable debris of the food is confined to the posterior portions of the intestine, the upper containing only granular or soft flocculent and disintegrated material. On examining the former they are found to consist of insect remains, amongst which is a small black ant almost entire. Our President, the Rev. Thomas Blackburn, has been good enough to examine the fragments submitted to him, and he informs me that they are portions of an orthopterous insect, probably those of a species of mole-cricket.

Stomach (Fig. 4).—This organ, which is evidently considerably compressed and contracted, measuring 1·75 cm. in its greatest length by 1·25 cm. in its widest part, is extremely simple in shape, the short segment of œsophagus which intervenes between it and the diaphragm springing from nearly the middle of the lesser curvature, so that about an equal length of the viscus lies on each side of it. It is empty, and the parietes are thick and muscular; the mucous membrane, less decomposed than in the intestines, being thrown into a few large longitudinal rugæ, which end at the pylorus. Externally the position of the pylorus is indicated by a circular constriction, to the intestinal side of which an outlying strip of the pancreas is closely adherent.

Pancreas.—The main mass of this organ lies in the usual situation, but it is too decomposed for accurate description or for determining the disposition of its duct.

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Liver.—As far as can be ascertained without removing the organ, and by reference to a damaged specimen from another animal, the liver consists of four distinct lobes, two large and two small, the former being ventral, and separated by a deep fissure. Of these, that on the left hand seems to correspond to the left lobe of the human liver, and the other to the lobus quadratus; of the smaller lobes, that which is dorsal, and on the left (but still to the right of the portal vein), probably corresponds to the lobus Spigelii. The other small one probably represents the human right lobe.

Apparently no gall-bladder exists, but the parts being rather decomposed in that region, I cannot be absolutely certain of this fact. There are, however, two hepatic ducts uniting into a considerable common bile-duct, which opens into the intestine 2·5 mm. from the pylorus.

Spleen.—This is an elongated flattened organ bent on the edge, so that its shape resembles that of the letter V with much expanded limbs.

Myology.—This is being worked out by Professor Wilson, of Sydney University, who will communicate his observations to this Society.

Conclusion.—It is necessary for me again to remark that I am but too well aware of many shortcomings in the above description, nor can I hope to have escaped errors of commission as well as of omission. Some points have been left obscure that undoubtedly might have been cleared up by reference to fresh material, but I was particularly anxious not to damage any more specimens than I could help. The number of them in my possession is still very limited, and I have been desirous in the interests of science both that some should be available for examination by more competent zoologists than myself, and that some other institutions more accessible to the scientific world should share the good fortune of the Adelaide Museum in possessing an example of an animal which is at the same time very difficult to obtain and of unusual zoological interest. I trust, however, that enough of its structure has now been made sufficiently clear to enable a correct conclusion to be formed, both as to its natural affinities and as to the manner in which this singular type—remarkable even in this land of curious and antique forms—should be classed. This discussion, however, must be left to a future occasion.

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EXPLANATION OF PLATE XII.

Fig. 1. *Notoryctes typhlops.* Female organs of reproduction, with their ligaments *in situ*. The right kidney is obscured by a coil of intestine. *Ventral view* (x 2½); *ov*, ovary; *od*, oviduct; *ut*, its uterine portion—[the foregoing are represented as seen through the broad ligament (*ll*); for its disposition *vide* text]—*op*, ovario-pelvic fold of the broad ligament; *s.l*, suspensory ligament of ovary and oviduct; *k*, kidney; *ur*, ureter; *bl*, bladder, hooked backwards; *int*, coil of intestine; *r*, rectum; *a*, line of attachment of median fold or septum of peritoneum to that covering ventral surface of the rectum; *b*, peritoneal attachment to coil of intestine (*vide* text).

Fig. 2. *Notoryctes typhlops.* Female organs of reproduction. *Lateral view* partly diagrammatic (x 2); *ov*, ovary; *od*, oviduct; *ut*, uterus; *k*, kidney; *ad*, adrenal; *ur*, ureter; *bl*, bladder; *ll*, broad ligament; *s.ug*, uro-genital canal; *r*, rectum; *cl*, cloaca; *c.g*, cloacal gland.

Fig. 3. *Notoryctes typhlops.* Female organs of reproduction. *Dorsal view* (x 2); *ov*, ovary; *od*, oviduct; *ut*, uterus; *ur*, ureter; *sug*, urogenital canal; *ll*, broad ligament; *bl*, bladder—the fundus, indicated by a dotted outline, is seen through the broad ligament; *c*, line of attachment of median peritoneal fold or septum to the dorsal surface of the broad ligament (*vide* Fig. 1).

Fig. 4. *Notoryctes typhlops.* *Antero-ventral view; (nat. size); gc*, greater curvature; *œ*, œsophagus; *p*, pylorus, pointing also to adherent strip of pancreas; *int*, small intestine; *h.d*, common bile-duct.

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Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read October 6, 1891.]

X.

STAPHYLINIDÆ.

SCOPÆUS.

S. dubius, Blackb. The habitat of this species is the Alpine regions of Victoria.

PSELAPHIDÆ.

EUPINES.

E. relicta, sp. nov. Mas. Glabra; nitida; supra lævis; obscure picea, pedibus antennisque dilutioribus; capite fere æquali; prothorace æquali leviter transverso, lateribus fortiter rotundatis pone medium subsinuatis; elytris prothorace dimidio longioribus, humeris callosis, striis suturalibus distinctis; antennis capiti prothoracique conjunctis longitudine æqualibus, modice clavatis; tibiis intermediis extus ante apicem late vix distincte emarginatis; metasterno late profunde excavato; abdominis segmento ventrali 2° in medio breviter transversim carinato. Long., ½ l.

Of the antennæ joints 1 and 2 are somewhat equal *inter se*, both being longer and stouter than the following joints; 3 and 4 are subequal *inter se*, 5 stouter and longer (nearly equal to 2), 6-8 a little shorter than 3 and 4 but not transverse, 9 of the same length but stouter, gently transverse; 10 a little longer and much stouter (rather strongly transverse), 11 twice as long, stouter, and of a darker color.

Femina a mare differt metasterno minus profunde excavato, abdomine haud carinato.

The antennæ of the female differ from those of the male in the fifth joint being smaller, and the ninth not wider than the eighth.

In my tabulation of certain species of *Eupines* (*vide* supra, p. 86) the present species would fall beside *E. militaris*, from which it may be distinguished *inter alia* by its much less strongly clavate antennæ. From *E. Victoriæ*, King, which is very insufficiently described, but perhaps resembles it, it differs by its glabrous surface.

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Victoria; taken by C. French, Esq., at Mordialloc, in flood refuse.

LAMELLICORNES.

MÆCHIDIUS.

M. pilosus, sp. nov. Piceo-brunneus; supra pilis elongatis erectis subtilibus sat dense, subtus setis squamiformibus albis et pilis brevibus erectis, vestitus; clypeo antice reflexo late fortiter triangulariter emarginato, ad latera late obtuse bidentato; prothorace transverso, lateribus serratis pone medium angulatis; elytris punctulato-striatis, interstitiis planis vix perspicue punctulatis; antennarum lamellis sat brevibus; unguiculis simplicibus; tibiis anticis sat fortiter tridentatis. Long., 4 l.; lat., $2\frac{1}{5}$ l.

Very distinct from nearly all its previously described congeners by the long, soft, erect hair clothing its upper surface. From *M. bidentulus*, Fairm., it would seem to differ by the strongly serrulate lateral margins of its prothorax; from *M. variolosus*, Macl., by its more strongly emarginate clypeus and its strongly tridentate front tibiæ.

W. Australia; Yilgarn; sent to me by C. French, Esq.

BUPRESTIDÆ.

BUBASTES.

B. occidentalis, sp. nov. Cylindrica; nitida; læte viridis, subaureo-micans, antennis tibiis tarsisque obscuris, corpore subtus pilis squamiformibus brevibus pallide ochraceis sat dense vestito; capite inter oculos sat concavo, fortiter sat crebre punctulato; prothorace quam longiori circiter tertia parte latiori, sat crebre (ad latera transversim rugulose) punctulato; elytris minus fortiter sat crebre sat rugulose punctulatis, manifeste striatis, apice emarginatis et bispinosis. Long., 7 l.; lat., $2\frac{1}{5}$ l.

A bright green species with a somewhat golden tone; compared with *B. inconsistans*, Thoms., and *laticollis*, Blackb., the disc of the prothorax is very much less closely punctured; *B. globicollis*, Thoms., seems to be punctured like *inconsistans*, and to have the sides of the prothorax strongly rounded (in this species they are as in *inconsistans*); *B. sphenoida*, L. & G., is described as having its entire surface evenly punctured (in this species the prothorax is very much more coarsely punctulate than the elytra); the puncturation of *B. cylindricus*, Macl. (from N.W. Australia), is not characterised, but totally different coloring and locality render identity most improbable. *B. splendens*, Blackb., comes near this insect, but is of considerably narrower form, with the

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puncturation of the head and the disc of the prothorax considerably sparser, the color more brilliant, &c.

W. Australia; in the collection of C. French, Esq.

B. laticollis, Blackb. I believe this to be identical with *B. globicollis*, Thoms., of which it must become a synonym if I am right in this belief. As I have before remarked, M. Thomson's Appendix to his Typ. Bupr. (in which this and other Australian *Buprestidæ* are described) escaped notice in the *Zoological Record* until some years after its publication, and (owing, I presume, to that omission) was not noticed in Mr. Masters' Catalogue; and so, unfortunately, I was not aware of the existence of the Appendix when I described *B. laticollis*.

B. splendens, sp. nov. Cylindrica; angusta; pernitida; splendide viridis, capite postice antennis que violaceis, corpore subtus pilis brevibus squamiformibus albidis vestito; capite inter oculos sat concavo, fortiter (antice sparsius postice confertim) punctulato; prothorace quam longiori quarta parte latiori, fortiter (disco sparsius lateribus his transversim rugulosis parteque antica sat crebre) punctulato, lateribus fere rectis; elytris sat fortiter sat crebre sat rugulose punctulatis, manifeste striatis, apice emarginatis et bispinosis. Long., 7 l.; lat., 2 l.

An insect of extremely brilliant coloring. Compared with *B. inconsistans*, Thoms., the prothorax is very much more sparsely punctured, and is not rugulose on the disc, while the elytra are less finely punctured, and more distinctly striated.

Central Australia; MacDonnell Ranges; in the collection of C. French, Esq.

MELOBASIS.

M. pulchra, sp. nov. Oblongo-ovalis; læte viridis, prothoracis vittis latis 2 et elytrorum notis intricatis purpureis; capite plano fortiter confertim punctulato; prothorace quam longiori plus quam dimidio (postice quam antice circiter quinta parte) latiori, in disco sat sparsim (ad latera confertim rugulose) fortiter punctulato, lateribus antice sat fortiter rotundatis postice fere parallelis; elytris confuse inæqualiter punctulatis, interrupte striatis, interstitiis hic illic leviter convexis, lateribus apicem versus denticulatis. Long., $4\frac{1}{2}$ l.; lat., $1\frac{3}{5}$ l.

The markings on the elytra are very complicated and difficult to describe clearly; their pattern is most readily characterised if the purple markings be regarded as the ground color; then the green is seen to form (*a*) a wide common sutural vitta from the scutellum more than a quarter of the length of the elytra, (*b*) a somewhat similar but slightly longer vitta on each elytron com-

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mencing about the middle of the base and sloping a little towards the suture, (*c*) a fascia-like mark about the middle of the disc not nearly reaching either the suture or the lateral margin and produced a little towards the base of the elytra at its external end (thus forming marks like ⌊ ⌋), (*d*) an oval obliquely placed spot about intermediate between the middle and the apex. The markings are extremely like those of some forms of *M. intricata*, Blackb., but that species has the prothorax very much less coarsely punctured and narrowed (with only slightly arcuate sides) from quite near the base to the apex. *M. fulgurans*, Thoms. (from Tasmania), is also very similarly marked and colored; it is, however, considerably larger (long. 6 l.), and is described as having the prothoracic vittæ black and the prothorax "regulariter punctatus;" M. Thomson's description is too brief to indicate whether the pattern of the elytra bears more than a *general* resemblance to that of the present species.

The sculpture of the head and prothorax is almost exactly as in *M. verna*, Hope, but the sides of the prothorax are much more strongly rounded than in that species.

Central Australia; MacDonnell Ranges; in the collection of C. French, Esq.

M. bicolor, sp. nov. Læte viridis, capite prothoraceque cupreotinctis, elytris totis igneo-cupreis; subtus pilis brevibus sparsis vestita; capite plano confertim fortiter punctulato; prothorace quam longiori dimidio (postice quam antice vix manifeste) latiori, sat fortiter sat crebre punctulato, obsolete (ad latera magis distincte) transversim rugato, lateribus vix arcuatis; scutello minuto; elytris leviter sat crebre parum æqualiter punctulatis, sat distincte 3-costatis, lateribus postice (fere a medio) denticulatis. Long., 5⅔ l.; lat., 2 l.

A conspicuous species on account of its bright fiery-copper-colored elytra. It resembles *M. nervosa*, Boisd., compared with which (apart from color) the head is smaller and less pubescent, the prothorax is a little less strongly punctured, and has less rounded sides, the elytra are not quite so strongly costate, the scutellum is smaller, the underside is much less strongly punctured, and the prosternum is declivous in front, with its anterior margin much less thickened. *M. Saundersi*, Masters, is very distinct by the apical spine of its elytra, and *M. costifera*, Thoms. (which must be very close to *Saundersi*) by the same character; *M. rubromarginata*, Saund. (from N.W. Australia), is very differently colored, and has four costæ on each elytron; *M. læta*, Saund., has the sides of the prothorax rounded, &c.; *M. Lathami*, Hope, has *inter alia* a very differently-shaped prothorax.

W. Australia; in the collection of C. French, Esq.

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ANILARA.

A. subcostata, sp. nov. Sat lata; sat nitida; cupreo-nigra, hic illic obscure cæruleo-micans; capite postice æqualiter convexo, striolato-alveolato; prothorace tumido (fere gibboso) quam longiori minus quam duplo latiori, ut caput sculpturato, postice quam antice sat latiori, lateribus fortiter rotundatis; elytris longitudinaliter leviter distincte 4-costatis, apicem lateraque versus sat crebre subfortiter granulosis (partibus ceteris obscure squamoso-punctulatis) lateribus postice distincte denticulatis; corpore subtus antice crasse leviter squamoso-punctulato, abdomine longitudinaliter carinulis subtilibus insigni. Long., 3l.; lat., $1\frac{1}{5}$l.

The prothorax is fully as wide as the elytra (to the eye rather wider). The conspicuous (in some lights) blue patches on both upper and under surface, together with the perfectly distinct costæ of the elytra and the ventral segments sculptured with very fine (but not at all close) longitudinal elevated lines, render this a conspicuous species. The prothorax is much less transverse than in *A. Adelaidæ*, Hope; the ventral sculpture resembles that of *A. planifrons*, Blackb.

S.A.; in the South Australian Museum.

A. soror, sp. nov. Sat lata; subopaca; nigra vix ænescens; capite linea longitudinali subtili impresso, sat crebre punctulato, puncturis umbilicatis; prothorace modice convexo quam longiori fere duplo latiori, crebre transversim striolato-alveolato, leviter canaliculato, postice quam antice sat latiori, lateribus sat fortiter rotundatis; elytris subtiliter granulatis, lateribus postice distincte denticulatis; corpore subtus leviter subcrasse alveolato-reticulato, segmento ventrali apicali longitudinaliter carinulis subtilibus insigni. Long., $3\frac{1}{5}$l.; lat., $1\frac{1}{5}$l.

Differs from the preceding *inter alia* by the complete absence of elytral costæ; it is much larger than any others of the previously described species.

N. Queensland; in the collection of C. French, Esq.

A. angusta, sp. nov. Parallela; minus lata; minus depressa; sat nitida; ænea; capite leviter striolato-alveolato, fronte sat late impressa, parte impressa in medio longitudinaliter convexa; prothorace sat convexo, quam longiori fere duplo latiori, postice quam antice haud latiori, in disco subobsolete latera versus distincte striolato-alveolato, margine antico perspicue bisinuato, lateribus leviter arcuatis; elytris manifeste transversim rugulosis obscure punctulatis, lateribus postice indistincte crenulatis; corpore subtus leviter sat crasse striolato-alveolato. Long., $2\frac{1}{5}$l.; lat., $\frac{4}{5}$l. (vix).

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Distinguished from the other described species of the genus by its more elongate and parallel form, and its prothorax as wide in front as at the base; also by the impression on the head, which is divided by an obscure longitudinal convexity down the middle; the hinder ventral segments are almost lævigate, and none of the ventral segments are longitudinally sculptured.

This species is, perhaps, near *A. Deyrollei*, Thoms., which, however, is (according to the measurements given) half as wide as long, and is a much smaller insect. M. Thomson's description is quite insufficient for certain identification.

Victoria; in the collection of C. French, Esq.

A. læta, sp. nov. Brevis; lata; modice convexa; sat nitida; obscure ænea, hic illic obscure aureo-vel cyaneo-tincta, elytris sat læte cupreo-purpureis; capite æquali convexo, leviter sat crasse striolato-alveolato; prothorace quam longiori vix duplo latiori, in disco vix distincte ad latera sat fortiter striolato-alveolato, antice sat angustato, lateribus modice rotundatis; elytris sat inæqualibus, distincte subtiliter granulatis, lateribus postice vix perspicue crenulatis; corpore subtus obscure (prosterni lateribus sat crasse sat fortiter) striolato-alveolato, segmentis ventralibus (apicali excepto) longitudinaliter carinulis validis insignibus. Long., $1\frac{1}{2}$ l.; lat., $\frac{3}{4}$ l. (vix).

A wide, short species, more brightly colored than is usual in the genus, and well distinguished by the strong longitudinal carinulæ of its ventral segments (except the last). It is near *A. Adelaidæ*, Hope, and *planifrons*, Blackb., but is distinguished from both, in addition to the characters just mentioned, by its somewhat less transverse prothorax, the sides of which are much less strongly rounded.

S. Australia; Lake Eyre basin.

CISSEIS.

C. dispar, sp. nov. Minus nitida; supra vix pubescens; prasina hic illic obscure subaureo tincta, vel tota sordide aureo-olivacea; capite subtilius minus crebre punctulato, antice late leviter concavo postice subtiliter carinato; prothorace quam longiori fere duplo (postice quam antice parum) latiori, concentrice subtilius striolato, medio antrorsum sat fortiter producto; scutello plus minus distincte transversim striolato; elytris sat æqualiter crebre subtilius leviter punctulatis, plus minus transversim rugatis, lateribus postice subtiliter vel vix distincte denticulatis; corpore subtus sparsim (abdomine ad latera magis crebre) pubescenti. Long., 3 l.; lat., $1\frac{1}{5}$ l.

The color is a dull grass-green, tinged in places with a dead brassy-copper tone, which is liable to overspread the whole upper

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surface; the underside is more nitid, and usually darker in color than the upper surface. The puncturation of the head is almost as in *C. roseocuprea*, Hope (more consisting of isolated punctures, and less tending to a striolated appearance than in most of its congeners); the shape and sculpture of the prothorax are nearly as in *C. æneicollis*, Hope (but without pubescent spots); the sculpture of the elytra has a slightly asperate appearance, being reticulately and minutely strigose, with the interstices of the strigæ somewhat resembling flattened granules, or it can be regarded as consisting of punctures surrounded with elevated margins. It is not very different from the elytral sculpture of *C. æneicollis*, Hope, but appears distinctly more asperate. The short longitudinal, carina-like, fine line on the summit of the head is characteristic. Probably this species is near *C. subcarinifrons*, Thoms., but the description of that species states that its prothorax is not transverse.

Victoria; sent to me by C. French, Esq.

C. bella, sp. nov. Sat angustata; nitida; aureo-ænea, elytris subpurpurascentibus, his et metasterni coxarum posticarum abdominisque lateribus maculis albis pubescentibus ornatis; capite antice longitudinaliter late sulcato, fortiter minus crebre punctulato et indistincte confuse strigato; prothorace quam longiori dimidio (postice quam antice parum) latiori, sparsim sat fortiter punctulato et subconcentrice minus crebre sat fortiter strigato, versus angulos posticos sat depresso, lateribus leviter arcuatis; scutello punctis nonnullis magnis notato; elytris minus confertim reticulato-striolatis, interspatiis subgranulosis, lateribus postice crenulatis. Long., 3 l.; lat., 1 l.

A brilliantly nitid species (especially the head and prothorax), with the head more coarsely punctured than in most of its congeners; it is perhaps near *C. cupreicollis*, Hope, but differs *inter alia* by its prothorax entirely devoid of pubescent spots. The pubescent spots on the elytra are arranged very much as in *C. æneicollis*, Hope, there being one on the shoulder, one near the lateral margin about the middle, one half way between the last-named and the apex, and one on the suture a little in front of the apex, the two nearest to the apex appearing to form an interrupted fascia. The elytra of *C. æneicollis* bear some additional smaller pubescent spots, which are wanting in this species (I do not think the example before me is at all abraded). Compared with *C. æneicollis* the present insect is of much narrower and more elongate form, with the puncturation of the head much less close, the prothorax very evidently less transverse, and the elytral sculpture (though of similar kind) markedly less close.

Victoria; in the collection of C. French, Esq.

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C. pygmæa, sp. nov. Sat angusta; minus nitida; ænea vel nigro-ænea, hic illic vix cyaneo-micans; pube albida maculatim ornata; capite late longitudinaliter concavo, sparsius vix fortius punctulato; prothorace quam longiori fere duabus partibus (postice quam antice haud multo) latiori, subtilius subconcentrice striolato, lateribus sat rotundatis, basi valde bisinuata; scutello opaco vix perspicue striolato; elytris crebre subtilius reticulato-striolatis, interspatiis vix distincte granuliformibus, lateribus postice denticulatis. Long., 2 l. (vix); lat., $\frac{7}{10}$ l.

The silvery-white pattern is not formed by pubescent impressions, but by coarse scale-like hairs, more or less sprinkled over the whole surface, but condensed into a large spot on the hinder part of the disc of the prothorax on either side, a large ill-defined spot on the base of the elytra, two wide ill-defined fasciæ on the elytra (one at the middle, the other near the apex, the latter somewhat dilated hindward on the suture and a little curved outwards close to the apex), and some spots on the sides of the ventral segments. I do not think this species is much like any of the very small species of *Cisseis* that have been described previously.

Victoria; in the collection of C. French, Esq.

C. verna, sp. nov. Sat angusta; sat nitida; viridis, hic illic cæruleo-micans; capite planato medio longitudinaliter sat subtiliter impresso, subopaco, coriaceo, sparsim minus fortiter punctulato; prothorace quam longiori duabus partibus (postice quam antice vix manifeste) latiori, vix distincte punctulato, in disco subtiliter (latera versus fortiter) transversim subconcentrice striolato, lateribus leviter arcuatis; scutello punctulato-striolato; elytris leviter sat crebre reticulato-punctulatis, lateribus postice subtiliter denticulatis. Long., $2\frac{1}{3}$ l.; lat., $\frac{4}{5}$ l.

There is a little very inconspicuous whitish pubescence on the elytra, where, however, it does not form a distinct pattern. The parts where the general bright green colour changes most distinctly to cyaneous are the apices of the elytra and the undersurface (the legs, however, being green). The sides of the metasternum and of the ventral segments are more or less pubescent. The prothoracic sculpture consists of transversely arched (scarcely concentric) striolæ, which are mere fine scratches in the middle, but deepen into strong wrinkles towards the sides. The surface of the prothorax is much depressed in the neighbourhood of the hind angles. In some lights the anterior part of the suture shows a distinctly golden tone of colour. The sculpture of the elytra is of the kind usual in allied species of *Cisseis* (*e.g.*,

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much like that of *C. æneipennis*, Hope, but perhaps a little less close).

This species is no doubt near *C. uniformis*, Thoms., and *minutissima*, Thoms., the former of which, however, is said to have the prothorax not transverse, the scutellum lævigate, &c.; while the latter is said to be of the form of an *Anthaxia* (which the present insect certainly is not), and also to have the prothorax "punctate-rugose."

Victoria.

C. perplexa, sp. nov. Sat elongata; convexa; sat nitida; nigricans, cupreo-micans (præsertim subtus), corpore subtus prothoracis lateribus capiteque sparsim argenteo-pilosis; capite fere æquali, antice leviter impresso, confuse sat fortiter vix crebre punctulato; prothorace quam longiori dimidio (postice quam antice vix perspicue) latiori, concentrice minus fortiter striolato, lateribus per carinæ intramarginalis intercessionem vix æqualibus, hac fortiter arcuata marginem anticum ad angulum lateralem vix attingenti; scutello subcoriaceo vix perspicue punctulato; elytris inæqualiter sat crasse rugulosis, antice et ad latera fortiter transversim rugatis, lateribus postice denticulatis. Long., 4 l.; lat., $1\frac{2}{5}$ l.

This species belongs to a small group of *Cisseis* (of which *C. Lindi*, mihi, may perhaps be considered the type distinguished by the extreme feebleness of the tooth on the claws, and also by the peculiar form of the intra-marginal carina of the prothorax, which is strongly arched, and touches (or nearly so) the true lateral margin, both at the base and apex instead of ending anteriorly (as in most species of *Cisseis*) on or close to the anterior margin considerably within its lateral extremity, and which consequently more or less crosses the outline (as seen from above) of the true lateral margin and makes the sides of the prothorax, as viewed from above, seem more or less uneven. All these species (as yet known to me) are entirely devoid of markings formed by pubescence, and are found in Western and South-Western Australia.

The present species is distinguished from the others of the group (independently of its more uniform and obscure coloring) by the much coarser sculpture of its elytra. This is of the same character as in most species of *Cisseis* (much as described above in *C. dispar*), but the interspaces of the wrinkles are unusually large, in front and towards the side being strongly transverse, and in parts of the disc appearing almost like irregular pustules.

Australia; I am not sure of the exact locality, but I have no doubt it is Western.

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DISCODERES.

D. torridus, sp. nov. Læte æneus, corpore subtus antice femoribusque cyaneis; pilis densis albis nigrisque maculatim dispositis vestitus; capite prothoraceque valde inæqualibus, striolato-alveolatis; scutello magno elongato triangulari; elytris singulis costam discoidalem ferentibus, acervatim punctulatis et in partibus nonnullis transversim rugulosis, lateribus postice crenulatis; tibiis posticis extus ad apicem dentiformibus. Long., 5 l.; lat., 2 l.

The sculpture of the upper surface is to a great extent concealed by dense pubescence, forming a pattern of marbled appearance; this pubescence takes the form of a transverse white fascia between the eyes, a dense white mass on each side of the prothorax, a number of smaller white spots on the elytra (some of which range themselves into two fasciæ behind the middle), some large black spots mostly in the hinder half of the elytra, a lateral white spot on the hind coxæ, a dense white mass on either side of the basal two ventral segments and some smaller white spots on the other ventral segments. The crown of the head bears two rounded and moderately conspicuous gibbosities; the prothorax is widely elevated down the middle line, the elevated portion bearing a ridge-like tubercle on either side in its hinder half; the elytra are much flattened (or almost concave, between the suture and the discoidal ridge. The sculpture of the prothorax is arranged in concentric lines. The carina within the border of the prothorax on either side is elongate and sinuous.

N. Queensland; in the collection of C. French, Esq.

CORÆBUS.

C. pilosicollis, sp. nov. Latus; æneus hic illic cyaneo-micans; prothorace utrinque et segmentis ventralibus (apicalibus 2 exceptis) dense (elytris obscure maculatim) albo-pubescentibus; capite valde inæquali, fortiter punctulato et certo adspectu longitudinaliter strigoso; prothorace in medio longitudinaliter gibboso, antice fortiter declivi, postice utrinque transversim profunde concavo, concentrice sat crasse striolato, intra marginem utrinque postice carina brevi instructo; scutello fortiter transverso, postice acuminato, ut prothorax striolato; elytris sat fortiter sat rugulose sat crebre punctulatis. Long., 6 l.; lat., 2½ l.

The arrangement of the pubescence is very distinctive; the pubescence is thin and little noticeable except on the sides of the prothorax and the whole abdomen (except the apical two segments), which are densely clothed with tolerably long silvery-white soft hairs. The chief inequalities on the head are a strong sulcus down the middle, a large transverse excavation between

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the eyes and a strong carina on either side bordering the eyes within.

I refer this insect to *Corœbus* a little doubtfully, as its facies is hardly of that genus; the short basal joint of the tarsi, transverse scutellum abruptly pointed behind, and short lateral carina of the prothorax seem, however, to place it there.

N. Queensland; in the collection of C. French, Esq.

AGRILUS.

A. Frenchi, sp. nov. Obscure viridis; pube tenui argentea minus crebre vestitus, vitta humerali et fascia postmediana denudatis; prothorace vix transverso, antice quam postice latiori, subtiliter transversim striolato, in medio longitudinaliter sulcato, postice utrinque impresso; scutello subcoriaceo, elytris sat crebre subrugulosis, apice emarginatis et spinis validis binis armatis. Long., $2\frac{4}{5}$ l.; lat., $\frac{3}{5}$ l.

Extremely distinct from the previously-described Australian *Agrili*, especially by the strongly bispinose apices of the elytra.

Victoria; in the collection of C. French, Esq.

PARACEPHALA.

P. ænea, sp. nov. Elongata; subcylindrica; sat nitida; ænea; pilis argenteis minus sparsim vestita; capite longitudinaliter canaliculato, quam prothorax magis nitido, sat fortiter sat crebre punctulato; prothorace elytrisque sat æqualiter confertim granuloso-punctulatis; illo fortiter transverso, disco medio subgibboso, parte gibbosa transversim subcarinata; elytris postice rotundatis denticulatis; corpore subtus latera versus sat dense argenteo-pilosis. Long., 3—$3\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.—1 l.

The peculiar form of the prothorax will render this species easily recognisable. The prothorax is scarcely marked off by a distinct line from the flanks of the prosternum. The present insect does not seem to differ structurally from *Paracephala (Agrilus) pistacina*, Hope, though it is very much larger, and its form is distinctly less narrow and cylindric; it is very similar in general facies to the species which I take to be *P. murina*, Thoms.

N. W. Australia.

CLERIDÆ.

ALLELIDEA.

The species described below is evidently a member of this genus. The basal joint of the tarsi being quite exposed when viewed from above would seem to place the genus near *Tillus*.

A. viridis, sp. nov. Cylindrica; linearis; nitida; pilis erectis sparsis vestita; viridi-ænea, antennis (clava excepta) palpis pedibusque (tibiis plus minusve infuscatis exceptis) flavis vel

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rufis, elytrorum lateribus postice albidis; capite crebre, prothorace sparsim, elytris subseriatim, fortiter punctulatis; Long., 2—2½ l.; lat., ⅔ l.

The insect is at its narrowest where the prothorax meets the elytra; the head, the middle of the prothorax, and the elytra close to the apex are about equal in width, and are the widest parts of the body. The prothorax is much longer than wide, and is narrow in the basal and apical parts being strongly and roundly dilated at, or slightly in front of, the middle. The elytra are considerably shorter than the hind body in the larger examples (which I take to be females), in a smaller one (probably a male) they are slightly longer than the hind body. The whitish color on the elytra is confined to the hinder part of the lateral margin in some examples, in others it covers the apex.

Victoria; taken by C. French, Esq., in flood refuse at Mordialloc.

CORMODES.

C. constricta, Blackb. This species described by me (Tr. Roy. Soc., S.A., 1890, p. 124) as a *Natalis* must be placed in *Cormodes* which Mr. Pascoe (Journ. of Ent., I., p. 46) characterises as closely allied to *Natalis*, but differing in the absence of wings, and in the elytra having no defined humeral angle. The wings of *C. constricta* are not quite wanting, but they are so rudimentary as to be useless for flight.

TARSOSTENUS.

T. univittatus, Rossi. I do not think that this cosmopolitan insect has hitherto been recorded as Australian. I have found it near Adelaide.

ZENITHICOLA.

Z. sosius, Chevr. The habitat of this species is given as "Australia." I have an example in my collection ticketed "South Australia."

Z. (*Clerus*) *crassus*, Newm. This species is certainly a *Zenithicola;* and equally certainly, I think, *Z.* (*Clerus*) *obesus*, White, is identical, so that the latter name must sink into a synonym.

TROGODENDRON.

T. (*Notoxus*) *ephippium*, Boisd. I do not think there is the least doubt that Boisduval's *Notoxus ephippium* is a *Trogodendron*, and I take it to be equally certain that *Notoxus ephippiger*, White, is the same thing. Although the examples for which the two names were proposed do not appear to have been even different varieties, the species appears to be a variable one, as I have seen examples with markings as specified in the descriptions, and others that I take to be certainly not

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distinct specifically, in which the yellow spot on the suture is very indistinct or even quite wanting. M. Chevrolat, in his Catalogue of the *Cleridæ*, places *N. ephippiger*, White, in *Opilus*; but I feel confident this is a mistake, as the finely-granulated eyes of specimens before me (which agree exactly with Boisduval's unusually full description, and also with White's) are quite inconsistent with a place in that genus. M. Chevrolat does not seem to have noticed the almost literal identity of White's and Boisduval's descriptions; indeed, I cannot find that he has referred to the latter at all.

THANASIMOMORPHA (*gen. nov.*).

Thanasimo affinis; differt palporum maxillarium articulo ultimo securiformi.

The Rev. H. S. Gorham (Cist. Ent., II., p. 62) points out the necessity of a new name for *Tillus bipartitus*, Blanch., but without proposing one. I therefore suggest the above name. Another member of the genus (as Mr. Gorham points out) is *Clerus guttulus*, White.

T. intricata, sp. nov. Nigro-picea vix violacea-micans, antennis palpisque obscure rufo-piceis, elytrorum tertia parte basali maculaque suturali postmediana metasterno femoribus ad basin tibiis anterioribus 4 (subtus) et tibiis posticis (totis) rufis, elytrorum fascia mediana (suturam vix attingenti) eburnea; capillis erectis vestita, ex his nonnullis albidis (in elytrorum pone medium partibus dilutioribus condensatis) nonnullis nigris; capite prothoraceque crebre profunde rugulose punctulatis, hoc quam longiori vix latiori, latitudine majori pone medium posita, lateribus sat rotundatis basin versus vix sinuatis; elytris basi utrinque gibbosis, antice crasse profunde postice vix manifeste, punctulatis. Long., $2\frac{4}{5}$ l.; lat., $\frac{3}{5}$ l.

Resembles *T. bipartita*, Blanch., but with the femora (except at base) and antennæ almost black, and a large red spot on the suture of the elytra behind the white fascia, and with the prothorax less rounded on the sides, and a little less closely rugulose.

W. Australia; taken by E. Meyrick, Esq.

METABASIS.

M. variegata, sp. nov. Fusco-nigra, pilis albis fuscisque vestita, ore palpis antennis prothorace elytrorum parte (fere dimidia) basali pedibusque rufis, elytrorum fascia media leviter arcuata et striga suturali apicali flavis; capite crasse confertim prothorace elytrisque crassissime minus confertim, punctulatis; prothorace fortiter transverso, late longitudinaliter sulcato, sulci lateribus antice subcariniformibus;

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elytrorum sculptura apicem versus paullo minus crassa. Long., 2 l.; lat., $\frac{4}{5}$ l. (vix).

Var. ? Prothorace elytrisque (notis flavis exceptis) totis fusconigris.

In the typical form the red and blackish portions of the elytra are separated from each other by the yellow median fascia except close to the lateral margin, where the blackish color is to be traced to some extent in front of the fascia. Differs from *M. accincta*, Newm. (apart from colour and size) by the median fascia of the elytra being gently arched all across (instead of straight)—its convex side forward—by the apical yellow of the suture extending considerably further forward, by the prothorax being evidently more transverse with a wide well-defined convexity down the middle, the external boundary of which is in front, distinctly subcariniform on either side, and by the puncturation of the whole upper surface being very evidently coarser and less close. In the dark var. there is no trace of pale coloring along the basal margin of the elytra.

S. Australia; under bark of Eucalyptus in the Tumby Scrub, near Port Lincoln.

PARAPYLUS (gen. nov.).

I propose this name for the insect which Mr. Newman described as *Pylus bicinctus*, and which subsequently was called *Necrobia pinguis*, White. The Rev. H. S. Gorham (Trans. Ent. Soc., 1878) has already discussed the characters of this type, and pointed out the need of a new generic name for it, but without proposing one.

CROBENIA (gen. nov.).

Necrobiæ affinis, sed oculis subtiliter granulatis, antennarum clava elongata laxe articulata.

This genus resembles *Necrobia* in its four-jointed tarsi with the basal joint covered by the second, in its laterally margined prothorax, and in the structure of its palpi, but the eyes are finely granulated and the antennal club is elongate, and consists of three joints, none of which is decidedly transverse. It is distinguished from *Paratillus*, *inter alia*, by its much less elongate form and different antennal club, from *Pylus* and *Parapylus* by the structure of its tarsi. The name I have used is an anagram of *Necrobia*.

C. Eyrensis, sp. nov. Sat nitida; sparsim albo-hirta; cyaneonigra, antennarum articulo basali prothorace et pedibus rufis; capite confertim sat crasse prothorace elytrisque crassissime minus confertim punctulatis. Long., 2 l.; lat., $\frac{4}{5}$ l.

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The prothorax is nearly half again as wide as long and is nearly evenly and rather strongly rounded laterally, but is at its widest slightly behind the middle; its lateral edges are finely but not very closely crenulate.

S. Australia; Basin of Lake Eyre.

PYLUS.

P. pygmæus, sp. nov. Testaceo-brunneus, elytris piceo-notatis; sparsim breviter pilosus; capite prothoraceque sat crasse nec crebre punctulatis; hoc vix transverso, medio longitudinaliter late nec profunde concavo, lateribus pone medium leviter rotundatim dilatatis; elytris striato-punctulatis prope apicem sculptura obsoletescenti. Long., $1\frac{4}{5}$ l.; lat., $\frac{3}{5}$ l.

The piceous markings on the elytra are not very clearly defined. They consist of a fascia slightly in front of the middle which is tolerably wide close to the lateral margin and narrows towards (but scarcely reaches) the suture, and another somewhat similar but much wider fascia slightly behind the middle and extending nearly to the apex; this hinder fascia is less narrowed than the anterior one towards the suture.

The coarsely-granulated eyes, laterally margined prothorax, and antennal and tarsal structure associate this very small *Clerid* with *Pylus fatuus*, Newm.

S. Australia; near Port Lincoln, in stems of *Xanthorrhœa*.

LYMEXYLONIDÆ.

ATRACTOCERUS.

A. Victoriensis, sp. nov. Ater; nitidus (capite elytrisque exceptis); capite creberrime ruguloso; prothorace quam latiori vix longiori, canaliculato, subquadrato, retrorsum leviter angustato, crebre sat fortiter punctulato; elytris crebre subtiliter aspere punctulato; abdomine supra a basi retrorsum gradatim minus perspicue punctulato, subtus fere lævi. Long., $8\frac{1}{4}$ l.

The previously-described Australian species of this genus (*A. Kreuslerœ*, Pasc.) is a much larger insect (long., 12 l.), and is of a ferruginous colour; as the specific characters mentioned in the description are almost limited to colour, it is not possible (without seeing the type) to distinguish this species from it otherwise than by saying that it is much smaller and entirely black.

Victoria; in the collection of C. French, Esq.

PTINIDÆ.

ANOBIUM.

A. paniceum, Lin. I do not think this species has been hitherto recorded as Australian; it is, however, common and widely distributed, no doubt introduced.

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A. domesticum. This also occurs in Australia; I have found it near Port Lincoln; as far as I know its occurrence has not been previously recorded.

DRYOPHILODES (gen. nov.).

Dryophilo affinis sed antennis aliter articulatis, articulo 2° quam 3us minori, articulis apicalibus præcedentibus haud dissimilibus.

The species for which I propose this name resemble *Dryophilus*, but their antennæ with the second joint small and no marked distinction between the apical joints and those preceding them seem inconsistent with a place in that genus.

D. insignis, sp. nov. Sat elongatus; sat parallelus; niger, vix rufescens, pube ochraceo-cinerea dense vestitus; prothorace maculis parvis 3 (transversim positis), elytris macula magna communi ovali denudata ornatis; hac pube alba circumcincta; scutello dense albo-piloso; prothorace sat convexo, inæquali vix transverso, antice fortiter rotundato-producto, lateribus bisinuatis, angulis posticis acute rectis deplanatis, basi media late lobata; antennis quam corporis dimidium longioribus. Long., 1$\frac{4}{5}$ l.; lat., $\frac{3}{4}$ l.

The sculpture is entirely buried under close pubescence, except on the denuded spots, where it appears that the prothorax is closely and asperately punctulate, and that the elytra are coriaceous rather than distinctly punctured. The large common oval spot occupying about the middle third part (both of length and breadth) of the elytra, with its conspicuous edging of white pubescence, renders this a most conspicuous species. The basal joint of the antenna is about as long as the next two together; 2 is slightly shorter than 3; 3-5 increase slightly in length; 6 is equal to 5; 7-10 are slightly longer, and equal *inter se*; 11 is slightly longer than 10; joints 4-10 are feebly triangular, and each joint being inserted slightly outside the middle point of the truncate apex of the preceding joint, the antennæ have a slightly serrated appearance.

Victoria; Alpine district.

D. australis, sp. nov. Minus elongatus; sat parallelus; piceus, antennis capite prothoracis marginibus abdomine pedibus et sutura postice rufescentibus; pube brunnea minus perspicue vestitus, scutello dense albido-hirto; capite prothoraceque confertim subtiliter subaspere punctulatis; hoc vix inæquali fortiter transverso antice modice rotundato-producto, lateribus fortiter rotundatis ante basin sinuatis, angulis posticis rectis, basi media late lobata; elytris crebre obscure punctulatis, obsoletissime striatis; antennis quam corporis dimidium vix longioribus. Long., 1$\frac{2}{5}$ l.; lat., $\frac{3}{5}$ l.

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The antennæ are a little shorter than in the preceding species, but their structure and the proportional lengths of the joints *inter se* are not different.

Victoria; Alpine district.

CISSIDÆ.

CIS.

C. Victoriensis, sp. nov. Minus angustus; sat nitidus; niger, antennis (clava excepta) pedibusque rufis; setis brevibus aureis sat dense vestitus; prothorace minus fortiter minus crebre, elytris leviter obscure fere subcrasse, punctulatis; capite planato vix perspicue punctulato fovea mediana impresso, margine antico explanato et (maris) profunde emarginato. Long., $\frac{3}{4}$—$\frac{4}{5}$ l.; lat., $\frac{1}{3}$ l.

Victoria; Alpine district; in fungi growing on trees.

OROPHIUS.

O. dilutipes, sp. nov. Nitidus; fere glaber; nigro-piceus, elytris abdomineque obscure rufescentibus, antennis (clava excepta) pedibusque testaceis; capite prothoraceque obscure subtilissime, elytris minus subtiliter, minus crebre punctulatis.

Maris capite antice perpendiculari, parte perpendiculari subcarinato-marginato et superne utrinque anguliformi; mandibulis porrectis, quam caput vix brevioribus, apice bifidis.

Feminæ capite æquali; mandibulis sat brevibus. Long., 1 l.; lat., $\frac{1}{3}$ l.

The prothorax is scarcely so wide as long, and is gently contracted from the base forwards, with its front margin considerably and roundly produced.

Victoria; Alpine district; in fungi growing on trees.

CISTELIDÆ.

ANAXO.

A. æreus, sp. nov. Sat nitidus; sat dense albido-pubescens; æreus; palpis (articulo ultimo excepto), antennarum articulis 2° 3° que (hujus apice infuscato) et articulorum nonnullorum sequentium basi, tibiis (his apicem versus infuscatis) tarsisque, rufis; capite angusto elongato, confertim subrugulose (labro crasse sparsim excepto) punctulato; prothorace sat parallelo, antice leviter rotundato-angustato, ut caput (sed etiam magis confertim) punctulato, quam latiori fere longiori, postice late leviter longitudinaliter canaliculato; elytris sat parallelis, quam prothorax minus quam duplo latioribus, punctulato-striatis, striis suturam prope sat pro

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fundis apicem versus obsoletescentibus, interstitiis punctulatis et transversim rugatis; antennarum articulo 3° quam 4us paullo longiori, 11° quam 10us vix minori.

Variat antennis tibiisque magis nigris vel magis rufis. Long., 4 l.; lat., 1 l.

I have not been able to satisfy myself as to the validity of the characters of the Australian genera which Mr. Bates has characterised near *Æthyssius* (Atractus). The shortness of the apical joint of the antennæ seems to vary with the sex, and also with the species; nor do I find the slight elongation of the second joint of the maxillary palpi at all a workable character, as it would lead to the separation into different genera of species that are (even as *species*) very closely allied. In the present insect the apical antennal joint is in one sex not, and in the other scarcely shorter than the tenth joint; indeed, I cannot find much to distinguish the insect from *Æthyssius*. It, however, resembles *A. brevicornis*, Bates, too much in general facies to be separated from it generically, in the absence of strongly-marked characters.

The species of this genus have much superficial resemblance to *Leptura*.

Victoria; Alpine district; on flowers.

A. Lindensis, sp. nov. Sat nitidus; albido-pubescens; niger vix æneus, femorum basi tibiisque flavis, his apicem versus plus minusve infuscatis, exemplorum nonullorum antennis basi obscure rufis; ut præcedens sculpturatus; capite paullo minus elongato, quam prothorax haud angustiori; prothorace vix canaliculato, antice vix angustato; elytris fere ut præcedentis sed minus parallelis, retrorsum a basi (præsertim maris) manifeste angustatis; antennarum articulo 3° quam 4us vix longiori, apicali quam 10us sat breviori. Long., 3 l.; lat., $\frac{4}{5}$ l.

S. Australia; on flowers near Port Lincoln.

A. cylindricus, Germ. (var.? *obscurus*). Ab exemplo typico differt antennis paullo magis elongatis, his pedibusque totis nigropiceis.

S. Australia; near Port Lincoln.

A. affinis, sp. nov. Sat nitidus; albido-pubescens; obscure niger, elytris fusco-æneis, pedibus (horum femoribus apice late nigris) antennarum basi palpis labroque testaceis; fere ut *A. æreus* sculpturatus sed elytris magis subtiliter punctulatis; capite prothoraceque fere ut *A. Lindensis*, sed hoc ante basin fovea rotunda impresso; elytris (sculptura excepta) ut *A. ærei*; antennis quoque ut *A. ærei*. Long., 4 l.; lat., 1 l.

Like *A. Lindensis*, this species is at once distinguished from

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A. æreus by its much wider head and its prothorax scarcely at all narrowed in front. From *A. Lindensis* it differs apart from colour and the finer elytral sculpture by the relatively longer third and apical joints of the antennæ, the former being markedly longer than the fourth, and the latter being scarcely, if at all, shorter than the tenth, while in *A. Lindensis* of both sexes it is quite evidently shorter.

S. Australia; near Port Lincoln.

A. ater, sp. nov. Nitidus; pilis erectis albidis vestitus; niger-rimus, palpis (articulo apicali excepto) mandibulisque rufescentibus; capite planato, crebre (labro sat sparsim) fortiter punctulato; oculis sat prominulis; prothorace sat parallelo quam caput vix latiori, subfortiter minus crebre nec rugulose punctulato, antice leviter obscure impresso, ante basin fovea magna rotunda profunda instructo; elytris sat parallelis quam prothorax minus quam duplo latioribus, sat fortiter (latera versus minus fortiter) punctulato-striatis, interstitiis sat crasse punctulatis et transversim rugatis; antennarum articulo 3° quam 4us fere sesqui longiori, apicali quam 10us vix breviori.

Maris femoribus posticis subtus late subdentatis; tibiis posticis flexuosis, in medio valde compressis et extus dilatatis; tibiis intermediis arcuatis. Long., 3 l.; lat., $\frac{4}{5}$ l.

The sculpture of this species is very similar to that of the S. Australian insect, which I take to be *A. brevicornis*, Bates, the prothorax being much less closely punctured than that of any of the preceding three species. From *A. brevicornis* (apart from size and color) it differs by its remarkable male characters. The hind femora are not, strictly speaking, "toothed," but their lower outline appears to be formed by two lines which meet in the middle in a distinct angle. It also differs from its allies in its eyes being evidently more prominent.

Victoria; Alpine district.

A. sparsus, sp. nov. Angustus; nitidus; fere glaber (? exemplo abraso); niger, antennarum basi mandibulis pedibusque rufescentibus; capite quam prothorax sat angustiori, fortiter minus crebre punctulato; prothorace leviter transverso sat parallelo crebrius subfortiter punctulato, dorso obscure depresso; elytris parallelis quam prothorax minus quam duplo latioribus, fortiter (latera versus paullo minus fortiter) punctulato-striatis, interstitiis subconvexis sparsim subtiliter punctulatis haud transversim rugatis; antennarum articulo 3° quam 4us paullo longiori, apicali quam 10us vix breviori. Long., 6 l.; lat., $1\frac{4}{5}$ l.

Resembles *Anaxo* (*Allecula*) *cylindricus*, Germ., but differs from

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it *inter alia* by its still narrower and more parallel form, by the punctures of its head more sparse and large, by its prothorax a little less closely and more strongly punctured, and by the striæ of its elytra more strongly, and their interstices much less closely and strongly punctured. From the widely-distributed S. Australian insect, which I regard as *A. brevicornis*, Bates, it differs *inter alia* by its more parallel form, its less-closely punctured head, and its elytra quite differently sculptured.

Victoria; in the collection of C. French, Esq.

A. puncticeps, sp. nov. Nitidus; obscure albido-pubescens; fuscus, antennis femoribus sternorum lateribus abdomineque nigris; capite quam prothorax paullo angustiori, creberrime (antice gradatim minus crebre) fortius sat rugulose punctulato; prothorace quam latiori vix longiori sat parallelo, medio ante basin leviter impresso, confertim sat subtiliter punctulato; elytris minus parallelis quam prothorax fere duplo latioribus, sat fortiter punctulato-striatis, striis latera versus obsoletescentibus, interstitiis crebrius fortius punctulatis vix transversim rugatis; antennarum articulo 3° quam 4us paullo longiori, apicali quam 10us manifeste breviori. Long., $5\frac{1}{2}$ l.; lat., 2 l.

Very similar to *A. cylindricus*, Germ., in form, from which (apart from colour) it differs *inter alia* by its conspicuously narrower head and prothorax, by its somewhat longer and more slender legs and antennæ, and by its less-strongly impressed elytral striæ, which become much more enfeebled towards the lateral margins.

This species bears a superfical resemblance to *Homotrysis fuscipennis*, Blessig, from which its simply pointed mandibles at once distinguish it.

Victoria; in the collection of C. French, Esq.

A. occidentalis, sp. nov. Nitidus (capite prothoraceque fere subopacis); vix albido-pubescens (? exemplo abraso); niger, elytris fuscis, labro mandibulis palporum antennarumque basi et pedibus fusco-testaceis; capite quam prothorax sat angustiori, sat confertim sat rugulose (labro sparsissime) punctulato, oculis sat prominulis supra minus remotis; prothorace quam longiori vix latiori, creberrime subtiliter subconfluenter sat aspere punctulato, ante basin leviter impresso, antice manifeste angustato, lateribus antice arcuatis; elytris postice leviter dilatatis, fortiter (latera versus multo minus fortiter) punctulato-striatis, interstitiis subconvexis sparsim subtiliter punctulatis; antennarum articulo 3° quam 4us sat longiori, apicali quam 10us paullo breviori. Long., 4 l.; lat., $1\frac{3}{10}$ l.

The extremely close puncturation of the prothorax, which

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renders the surface subopaque, and tends to become confluent in forming longitudinal wrinkles, will at once distinguish this species from its previously described congeners.

The apical joint of the maxillary palpi is a little shorter and more widely cultriform than in the allied species. This character is suggestive of *Licinnius*, Bates, but I do not find it accompanied by the other characters mentioned as distinctive of that genus. It is likely that Mr. Bates would regard this as a new generic form.

W. Australia.

The following is a tabulation of the hitherto described species of Anaxo :—

A. Prothorax not subopaque through the presence of very close longitudinally confluent puncturation.
  B. Puncturation of head very noticeably closer than of prothorax.
    C. Interstices of elytra closely punctured.
      D. Legs entirely black ... ... ater, Blackb.
      DD. Legs partly yellow ... ... brevicornis, Bates
    CC. Interstices of elytra sparingly punctured. ... ... puncticeps, Blackb.
  BB. Puncturation of head and prothorax equally (or nearly so) close
    C. Species of a distinctly metallic tone of color.
      D. Head not (or scarcely) narrower than prothorax.
        E. Apical joint of antennæ distinctly shorter than tenth joint. ... ... Lindensis, Blackb.
        EE. Apical joint of antennæ not shorter than tenth joint ... ... affinis, Blackb.
      DD. Head much narrower than prothorax. ... ... æreus, Blackb.
    CC. Color not at all metallic.
      D. Interstices of elytra very finely and very sparingly punctulate ... ... sparsus, Blackb.
      DD. Interstices of elytra much more closely and strongly punctulate ... ... cylindricus, Germ.
AA. Prothorax subopaque through the presence of very close longitudinally confluent puncturation. occidentalis, Blackb.

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The description of *A. fusco-violaceus*, Fairm., does not enable me to place that species in my tabulation, but it appears to differ from all the above in its cyaneous or violaceous colour.

N.B.—It appears to me (as already intimated) difficult to characterise *Anaxo* by very satisfactory structural characters among the Australian *Cistelidæ* having the mandibles simply pointed at the apex, the head well-prolonged in front, the apical joint of the maxillary palpi elongate-cultriform, and the legs and antennæ more or less stout and short. Its species (so far as known to me) are distinguished by their more or less parallel form and obscure coloring, none of them being brilliantly metallic (as are *Æthyssius* and *Alcmæonis)* or brightly colored or with markings on elytra or prothorax (as are *Licymnius*, *Chromomæa* and *Apellatus)*. The eyes are not approximated to each other in either sex. There are also slight structural characters attributed to each of the genera just named which are not found in any of the species I have called *Anaxo*. *Synatractus* seems to be remarkable by the very elongate apical joint of its antennæ, and *Lisa* and *Ismarus* are both described as having very slender antennæ.

The sexual differences in *Anaxo* appear to be but slight, except in *A. ater* (whose sexual characters render its place in *Anaxo* doubtful); the males seem to be distinguished merely by smaller size and narrower form, by the intercoxal process of the basal ventral segment being somewhat elevated above the general plane of the segment, by a tendency to diminution of size on the apical joint of the antennæ, and (at least in some species) very slight differences in the apex of the last dorsal segment.

APELLATUS.

The species of this genus resemble each other very closely in general appearance, but have extremely strongly marked and distinctive sexual characters in the antennæ of the males (so far as I have seen). The following names have been applied to species appertaining to it :—*amœnus*, Pasc. (N. S. W.), formerly *lateralis*, Pasc., (nom. præocc.); *lateralis*, Bohem. (N.S.W.) (Euomma); *palpalis*, Macl. (Qu.); *Mastersi*, Macl. (Qu.); *apicalis*, Black. (W. Austr.).

I have before me three species, of two of them both sexes. The males differ from the females in the smaller size, in their very much longer palpi (the second joint very long and slender, the apical curved and very elongate-cultriform), in the closer approximation of their eyes, in the remarkable dilatation of some of the intermediate joints of their antennæ, in their more strongly arched tibiæ, and in the intercoxal process of the basal ventral segment being a little elevated anteriorly and not quite continuing the plane of the general surface of the segment.

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It appears to me pretty certain that *A. amœnus*, Pasc., is a mere synonym of *lateralis*, Bohem., nor can I help thinking that Mr. Pascoe was mistaken in the opinion that he was describing the male. If it was the male, either the sexual characters of that species are very different from those of allied forms, or the author passed over unnoticed a very remarkable structure in the palpi. The description of the antennæ, moreover (subfiliform with the apical three joints a little shorter than the rest and somewhat compressed), seems suggestive of a female, although I should say that I have not seen an *Apellatus* of either sex whose antennæ quite present those characters. I conclude therefore that *A. lateralis*, Bohem. (lateralis, Pasc.—amœnus, Pasc.), is a species I have not seen of which it is doubtful whether the male is known.

I should say it is equally certain that *A. Mastersi*, Macl., is the female of *A. palpalis*, Macl. The colour differences of the two are of no account—the two species before me, of which I have both sexes, vary even more in colour. It is possible that *A. palpalis*, Macl., is the same as *A. lateralis*, Bohem., but this I think wants proof. One of the species before me may, I think, be Sir W. Macleay's insect (although its habitat in South Australia suggests doubt), but that author's description is not definite enough for certainty. If it be *palpalis*, I think it is probable that *palpalis* is distinct from *lateralis*, as the antennal structure in my examples does not quite agree with that of *lateralis*.*

I may add that the absence or presence of a slight pubescence on species of *Apellatus* is of no importance; very fresh specimens have a slight pubescence which is easily rubbed off.

A. apicalis, from Western Australia, is known only by a female, but it is at once distinguishable from the other *Apellati* by its different puncturation as well as different *style* of marking.

A. nodicornis, sp. nov. Leviter sparsim pubescens; testaceus vel rufo-testaceus, plus minusve infuscatus, lateribus apice (et nonnullis exemplis sutura) elytrorum nigris.

Maris antennarum articulo 7° fortiter dilatato; tibiarum posticarum parte apicali subito latiori et paullo ante apicem subdentata.

Feminæ antennarum articulis 3-10 inter se sat æqualibus. Long., 3—4½ l.; lat., ⅘ l.—1⅖ l.

The ordinarily coloured specimens are of bright rufo-testaceous

* Since writing the above I have examined the types of *A. palpalis* and *A. Mastersi* in the Macleay Museum. They are certainly male and female of one species, and are identical with the S. Australian species mentioned above. There are in the Macleay Museum also two examples labelled "*A. lateralis*, Pasc," and these also are identical with *A. palpalis*.

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colour—the elytra pale testaceous-brown, with a blackish vitta commencing on each shoulder and gradually widening hindward till the two combine and fill up all the apex. The labrum and clypeus are deeply and pretty closely punctured, the back of the head and the prothorax finely and closely but not deeply. The prothorax has a wide impression down the middle and a small one close to the base on either side. The elytra are punctulate-striate, the interstices punctured.

This species is extremely like the S. Australian one referred to above, but differs from it in the male having all the joints 3-11 of the antennæ subparallel and but little compressed (8-10 shorter than the rest, 11 longer), except the seventh joint, which is strongly compressed and evidently arcuate, with its external apex produced in a short spine; joints 8-10 are a little narrower as well as shorter than 3-6, and 9-10 are a trifle narrower than 8; joint 3 is distinctly shorter than 4. In the female joints 3-11 are very uniform. The maxillary palpi of the male set back reach the prothorax.

Victoria; Alpine district; under bark of Eucalyptus.

A. nigricornis, sp. nov. Leviter sparsim pubescens; testaceus, prothorace rufescenti, antennis (basi excepta) palpis elytrorum lateribus sutura apiceque et abdominis lateribus apiceque nigris, tibiis tarsisque infuscatis.

Maris antennarum articulis 4-10 sat æqualibus minus fortiter compressis, apicali quam præcedentes longiori.

Femina latet. Long., 3 l.; lat., $\frac{4}{5}$ l.

This species scarcely differs from *A. nodicornis* except in its black antennæ and palpi and in the different structure of the male antennæ. The basal joint of the antennæ is red and the second reddish.

Victoria; Alpine district.

CHROMOMÆA.

C. maculicornis, sp. nov. Sat elongata; postice angustata; glabra; subnitida; ferrugineo-rufa; capite (labro excepto), mandibulis apice, antennis (articulis 1° 2° 3° 8^{i} apice 9° 11^{i} que apice exceptis), scutello, elytrorum basi sutura lateribus apiceque, prosterni medio, metasterni lateribus, femorum apice, tibiarum basi apiceque, et tarsis, nigris vel nigro-piceis; capite fortiter sat crebre punctulato, oculis inter se remotis; prothorace quam latiori vix longiori, antice paullo angustato, ante basin fovea mediana elongata instructo, subtiliter sparsius punctulato, lateribus vix arcuatis, angulis posticis obtusis; elytris fortiter punctulato-striatis, interstitiis sat fortiter convexis sparsim subtiliter punctulatis. Long., $5\frac{1}{5}$ l.; lat., $1\frac{3}{5}$ l.

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A species presenting an extremely intricate mixture of reddish ferruginous and black colouring, the black usually shading off vaguely into piceous and here and there inclining to reddish. It is probably allied to *C. pallida*, Bates, but differs not only in colour (especially in the variegated antennæ) but also in the puncturation of several parts, notably the interstices of the elytra which in Mr. Bates' species are said to be "rather closely punctured," while in the present species the punctures on the interstices are about as sparse as they could well be. The antennæ are somewhat slender, not at all serrate, the third joint not much shorter than the fourth and fifth together.

Victoria; in the collection of C. French, Esq.

C. rufipennis, sp. nov. Minus elongata; minus parallela; postice angustata; sat nitida; nigra, elytris rufis (margine summo laterali nigro) sat dense sericeo-pubescentibus; capite crassius crebrius punctulato; oculis inter se remotis; prothorace quam longiori vix latiori, antice paullo angustato, ante basin fovea mediana rotundata magna profunda instructo, sat crebre sat fortiter punctulato, lateribus vix arcuatis, angulis posticis fere rectis; elytris punctulato-striatis, interstitiis (alternis quam cetera magis fortiter) convexis crebre punctulatis.

A very distinct species, suggestive by its colours—and to some extent by its form—of some vars. of *Stenoderus suturalis*, Oliv. The antennæ are moderately stout, the intermediate joints a little dilated within so as to present a slightly serrated appearance; the third joint is considerably longer than the fourth.

Victoria.

PSEUDOCISTELA (gen. nov.).

Caput antice sat productum; mandibulæ apice acuminatæ, haud bifidæ; palporum maxillarium articulus secundus brevis robustus; apicalis latissime (fere ut *Metistetis*), labialium leviter, triangularis; oculi haud approximati; antennæ sat (vix minus quam *Anaxo*) robustæ sat elongatæ; prothorax transversus a basi antrorsum fortiter rotundatim angustatus; corpus ovale, alatum.

The little *Cistelid* for which I propose this name cannot, I think, be referred to any previously characterised genus. Its oval form distinguishes it from most, if not all, of the genera having the head produced into a beak, and the mandibles simply pointed. In Lacordaire's arrangement it would fall into the "groupe Cistelides vraies." The sexual differences seem to be very slight; the males are somewhat narrower and more attenuated behind, with the antennæ more slender (but scarcely longer) than those of the female, and the intercostal process of the hind body

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slightly raised in front, the hind body itself being narrower and more convex transversely. The general facies is suggestive of *Cistela*.

P. ovalis, sp. nov. Sat nitida; ovalis; sparsim brevissime griseo- vel fulvo-pubescens; nigra, palpis antennarum basi tibiis anticis et unguiculis omnibus rufo-testaceis; supra crebre subtiliter sat profunde sat æqualiter punctulata; elytris prope suturam obsoletius striatis; corpore subtus subfortiter minus crebre punctulato.

Variat antennarum parte dimidia basali et pedibus totis (vel plus minusve), rufo-testaceis. Long., $2\frac{1}{5}$—$2\frac{1}{2}$ l.; lat., $\frac{4}{5}$—1 l.

The base of the prothorax is as wide as the base of the elytra; in the males the greatest width is in front of the middle of the elytra, which is very evidently, but not very much, wider than that of the base; in the females the elytra are evidently wider. and at their widest about the middle.

Victoria; Alpine district; on flowers.

HOMOTRYSIS.

The Australian *Cistelidæ* having bifid mandibles, described prior to 1866, were all referred by the authors to *Allecula* and *Cistela*. None of them, I think, were satisfactorily described (unless it be *Allecula fuscipennis*, Blessig), even Germar's descriptions being unreliable, because he placed in *Allecula* at least one species having simple mandibles; the rest are unrecognisable, unless the types be referred to. In 1866 (Journ. of Ent.) Mr. Pascoe very briefly characterised three new genera for this group of *Cistelidæ*—*Metistete*, *Homotrysis*, and *Hybrenia*. I think I have not seen either of the species their author placed in *Hybrenia*, but I am unable to regard the characters by which he distinguished them from *Homotrysis* as satisfactory, inasmuch as one of them (the approximation of the eyes) I find to vary considerably (and even sexually) among species that certainly seem incapable of being suitably placed in different genera, and the other (the close application of the prothorax to the elytra) seems to me to be presented by nearly all the Australian *Cistelidæ* of this group, even *H. microderes* (I have no doubt *Allecula fuscipennis*, Blessig), which Mr. Pascoe himself placed in *Homotrysis*, having the prothorax very closely fitted to the elytra, and the eyes considerably approximated in the male. I do not, of course, say that *Hybrenia* is not a good genus, only that the characters given to distinguish it from *Homotrysis* appear to me insufficient. As to *Homotrysis*, I take it to be a good genus, as the Australian species near *Allecula* seem to be unsuitably placed in the latter genus. *Metistete* also appears to be a good genus, its most distinctive character (not mentioned by its author) being

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the absence of wings for flying. In 1879 Heer Haag-Rutenberg characterised two new genera for Australian *Cistelidæ*—*Lisa* and *Ismarus*—but without any statement whether they belong to the section with simple or apically bifid mandibles. The descriptions of these genera are most unsatisfactory (*e.g.*, implying that the maxillary palpi have only three joints, and in one place calling the labrum of *Ismarus* "abgerundet," and in another "gerade"). I am inclined to hazard a guess that *Ismarus* is a synonym of *Metistete*. *Lisa* is characterised at some length, but without the mention of any character that strikes me as really valuable for distinction among allied Australian forms, and the author at the end of his diagnosis remarks that the genus is distinguished by the large apical joint of its maxillary palpi, its "kissenartig gewölbte" prothorax, and its long legs and antennæ. I find some or all of these characters in species before me, but I am quite unable to regard them as generic, unless one makes a new genus for nearly every species of the group. In the description of the *species* on which *Lisa* is founded *(L. singularis)* there is, however, mention of two characters which appear to me much more likely to be workable for generic distinction than any of those the author calls generic. These are the presence of a dilatation in the middle of the inner margin of the front tibiæ (said to be a male character—probably correctly, I think) and of a foveate sulcus near the lateral margin of the elytra. I find each of these characters (apparently even in a more developed form than in the type) in several species before me, and *Allecula elongata*, Macl., presents the latter of them, but I have not seen them both in the same specimen—perhaps because I do not possess a male of a species having the elytral sulcus. I incline to think that the Australian species of the *Cistelidæ* allied to *Allecula* can be satisfactorily divided into genera only by their sexual characters, for which division our knowledge of species is as yet insufficient. My conclusion, therefore, is that the first genus characterised for them *(Homotrysis)* may stand as against *Allecula*, and I am able to point out that *Metistete* is apterous, and therefore distinguishable from *Homotrysis*, while it seems that the characters assigned to *Hybrenia* and *Ismarus* are shared by numerous forms incapable of being considered as strictly congeneric (although it is probable enough that when both sexes of a large number of Northern forms are known there may appear good reason for retaining those names and re-characterising them).

Among the *Cistelidæ* of this group in my collection there are several species that it would be quite impossible to associate with any of the genera mentioned above on account of complete difference in facies, although I have not been able to satisfy

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myself of the existence of structural characters that could be relied upon as generically invariable. These are of oval form, and are much less elongate than any of the above mentioned genera, their shape being suggestive of *Harpalus* and in some cases of *Choleva*, while *Hybrenia*, &c., approximate more to the appearance of *Telephorus*, or *Tenebrio*. I have spent some time in examining these insects in search of a workable method of *defining* this distinction provisionally until the comparison of both sexes of a large number of species be possible (which will probably lead to a much more scientific diagnosis), and have found that this difference in facies seems reliably associated with a difference in the comparative length of the femora and width of the body. In *Homotrysis*, *Hybrenia*, &c., the hind femora, if laid out at right angles to the central longitudinal line of the body, extend by at least a third of their length beyond the external margin of the elytral epipleuræ, while in these more oval forms the projecting piece of the femora similarly placed is much shorter. In these latter, also, the head, as compared with the prothorax is very much narrower. I find it necessary to characterise two new genera for them, as there are two very distinct types among them differing in the general facies and in the structure of the femora. I divide the Australian genera of *Cistelidæ* with bifid mandibles as follows:—

A. Hind femora much longer than the distance from their base to the external margin of the elytral epipleuræ.	
B. Apterous	Metistete
BB. Winged	Homotrysis
AA. Hind femora little (or scarcely) longer than the distance from their base to the external margin of the elytral epipleuræ.	
B. Tibial depression beneath femora very long. Facies of *Harpalides*	Scaletomerus
BB. Tibial depression beneath femora much shorter. Facies of *Choleva* or *Platydema*	Nocar

Homotrysis (as I regard it) has been subdivided thus (assuming Haag-Rutenberg's species to have mandibles bifid at the apex):—

A. Apical joint of maxillary palpi of ordinary size.	
B. Eyes approximate. Prothorax closely applied to elytra	Hybrenia
BB. Eyes more distant. Prothorax less closely fitted to elytra	Homotrysis
AA. Apical joint of maxillary palpi very large ...	Lisa

Finding myself unable (as already pointed out) to determine to which of *Hybrenia*, *Homotrysis*, and *Lisa* should be referred

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certain of the species before me, which certainly belong to *Homotrysis* under the former of the above tabulations, I have thought it best to disregard for the present these two unsatisfactory *generic* names, and to call *Homotrysis* all the species that would be referred to it by the former of the above two tabulations.

The following is a tabulation of the species described below, together with two or three other species introduced for the sake of comparison :—

A. Interval between eyes less (at least in the male) than the width of either eye as seen from above.
  B. Upper surface densely clothed with erect pilosity.
    C. Punctures of elytral striæ scarcely distinct, those of the interstices very conspicuous.
      D. Legs and antennæ entirely testaceous or rufo-testaceous.
        E. Elytra with well-defined dark piceous markings ... ... limbata, Blackb.
        EE. Elytra uniformly rufous ... rufa, Blackb.
      DD. Legs and antennæ obscure ... fusca, Blackb.
    CC. Punctures of elytral striæ very conspicuous, interstices nearly lævigate, though granulated behind ... ... rugulosa, Boisd.
  BB. Upper surface not clothed with dense erect pilosity, uniformly coloured
    C. Elytra somewhat evenly sculptured.
      D. Elytra black or bluish.
        E. Size large (long. about 6 l. or more).
          F. Front part of elytral striæ punctured conspicuously, and with much larger punctures than the interstices ... nitida, Blackb.
          FF. Elytral striæ in front (especially near suture) punctured scarcely differently from the interstices tenebrioides, Blackb.
        EE. Size small (long. about 4 l. or less)
          F. Antennæ, tibiæ, and tarsi testaceous red ... ruficornis, Blackb.

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FF. Antennæ, tibiæ, and tarsi black	lugubris, Blackb.
DD. Elytra fulvous brown ...	fulvipennis, Blessig.
CC. Elytra in front with a deep foveate sulcus near the margin	princeps, Blackb.
BBB. Upper surface with markings composed of pale pubescence...	maculata, Haag-Rut
AA. Interval between eyes in both sexes greater than the width of either eye as seen from above ...	carbonaria, Germ.

HOMOTRYSIS.

H. maculata, Haag-R. In my collection there are three examples (from the N. Territory) which must be referred, I think, to this species, which was described on a specimen from Cape York, and seems to be a very variable insect, as no two of the three are quite identical with each other. One of them is nearly black, and has a strong tooth on the inner margin of the front tibiæ (being probably a male). The other two are coloured in accordance with the description; one of them, however, has the elytra much more roughly sculptured than the other and than the type (according to description), and is considerably more parallel, and may perhaps represent a distinct species (it is very much broken, unfortunately), but the pubescent markings on the upper surface of this species are so peculiar that it seems hardly likely two species exactly possessing them should occur in the same locality. The principal difficulty of identification consists in Haag-Rutenberg describing the under surface as "vix punctatum," whereas in all three of my specimens it is very distinctly punctured. I think the author must have made a mistake in this character, as it seems hardly probable that a surface clothed with strong hairs should not be punctulate.

H. carbonaria, Germ. I have lately observed that Haag-Rutenberg mentions his having seen the type of this species, and also of *H. tristis*, Germ., and does not speak of their being identical. Nevertheless, I adhere to the opinion I have already expressed, that *H. carbonaria* is the male, and *H. tristis* the female, of one species. At any rate, all the examples I have seen agreeing with the description of each are of the sexes just named. The males have the eyes evidently more approximated than the females, and, owing to the narrowness of the hind body, the sides of the elytra extending beyond it, appear in certain lights to have a fuscous margin, the existence of which I believe was by a careless observation stated by Germar to constitute a variety. The undersurface of the elytra is of a fuscous colour. In *H. fuscipennis*, Blessig, I find a similar sexual difference in the pilosity of the prothorax.

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H. lugubris, sp. nov. Elongata, sat parallela; minus convexa; sat nitida; sparsim obscure griseo-pubescens; atra, antennis pedibusque picescentibus, unguiculis testaceis; capite sparsim fortiter punctulato, oculis sat approximatis; prothorace quam longiori plus quam sesquilatiori, vix perspicue (ante basin profundius) canaliculato, ante basin utrinque manifeste impresso, fortius sat crebre punctulato, a basi antrorsum sinuatim angustato, basi leviter bisinuata quam margo anticus sat latiori, angulis posticis fere rectis apice summo rotundatis, elytris crebre fortius punctulatis, fortiter striatis, interstitiis transversim rugatis; corpore subtus sparsius (abdomine magis sparsim) punctulato; antennis quam corporis dimidium sat longioribus, articulo 3° quam 1us duplo (quam 4us paullo) longiori. Long., $3\frac{4}{5}$ l.; lat., $1\frac{1}{5}$ l. (vix).

I believe the specimen before me to be a male, on account of the intercoxal process of the hind body being strongly elevated above the general plane of the basal segment; the hind body being wider and less convex transversely than is usual in males of this genus suggests a doubt, however.

Placed beside *H. carbonaria*, Germ., this species is considerably smaller, and is devoid of erect hairs, except on the front part of the head; it is considerably narrower, more parallel, and less convex; the head is much less closely punctured, the eyes are evidently more approximate, the surface of the prothorax is differently impressed, and a little less closely punctured, with hind angles more tending to be prominent laterally; the elytra are less nitid, and more finely and closely punctured and wrinkled; the third and fourth joints of the antennæ are relatively shorter, and the whole antennæ are more slender.

The narrow form, slight convexity, absence of erect pilosity, somewhat different antennæ, and absence of a fovea on the apical ventral segment suggest the probability of this species being eventually separated generically from *H. carbonaria*, but I do not think it can be referred to any genus yet characterised as distinct from *Homotrysis*.

Victoria; Alpine district.

H. ruficornis, sp. nov. Elongata; sat parallela, minus convexa; minus nitida; pilis fulvis brevibus suberectis obscure vestita; nigra, ore labro palpis antennis tibiis tarsisque testaceo-rufis; capite prothoraceque subtilius sat crebre punctulatis; oculis sat approximatis; prothorace (puncturatione excepta) ut *H. lugubris;* elytris confertim subtilius punctulatis, sat fortiter striatis, interstitiis vix perspicue transversim rugatis; corpore subtus sat crebre subfortiter (abdomine multo minus fortiter) punctulato; antennis (colore excepto) ut *H. lugubris*. Long., 4 l.; lat., $1\frac{2}{5}$ l.

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Very near the preceding in all structural characters, but very different in colouring and sculpture, the prothorax being much more closely punctured, the elytra more finely and closely punctured and more feebly striated, &c. The eyes are somewhat larger, and still more approximated, the interval between them being only about half as wide as the width of either eye looked at from above; this may be sexual, but I find no decided character to indicate the sex of either species, and incline to think that both examples are males.

Queensland; sent from Brisbane by F. M. Bailey, Esq.

H. rugulosa, Boisd. (?). Modice elongata; sat parallela; minus convexa; nitida; pilis elongatis erectis sat crebre vestita; fusca, capite et corporis subtus partibus nonnullis fere nigris, elytrorum sutura rufa; capite sat sparsim minus crebre punctulato, oculis modice approximatis; prothorace quam longiori fere dimidio (postice quam antice haud multo) latiori, sparsim fortiter punctulato, late leviter canaliculato, ante basin utrinque impresso, lateribus modice arcuatis, basi leviter bisinuata, angulis posticis leviter obtusis; elytris vix striatis, potius puncturis sat magnis seriatim ornatis, interstitiis sat planis sparsim seriatim punctulatis postice subrugulosis; antennis quam corporis dimidium longioribus; articulo 3° quam 4us paullo breviori; corpore subtus sparsim minus fortiter punctulato, segmento ventrali apicali plus minusve profunde impresso.

Maris quam feminæ antennis longioribus, paullo magis compressis (exempli typici articulis 9-11 carentibus). Long., $2\frac{4}{5}$ l.—$3\frac{2}{5}$ l.; lat., $\frac{4}{5}$ l.—1 l.

This species has much resemblance to the preceding, but is at once distinguishable from all its allies known to me by the long erect pilosity with which it is clothed and the brightly nitid very thinly punctured interstices of its elytral striæ, which become a little uneven and transversely rugulose towards the apex. The interval between the eyes is much less in both sexes than the width of either eye as seen from above. Unless the type of *Allecula rugulosa*, Boisd., can be referred to it will be impossible to identify any species with it except doubtfully, as the description (of eight words) is quite insufficient, but the colour and pilosity, as mentioned, agreeing with the specimens before me, and being unusual in the genus, and the species before me being a widely distributed one, is very likely to be what Boisduval described.

S. Australia and Victoria.

H. limbata, sp. nov. Sat elongata; modice parallela, antice posticeque angustata; minus convexa; nitida; pilis minus

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brevibus sat dense vestita; rufa, elytris ad latera vitta picea ab humeris retrorsum gradatim latiori ornatis; capite fortiter sat crebre punctulato; oculis sat approximatis; prothorace quam longiori parum latiori, fortiter minus crebre punctulato, haud vel vix canaliculato, ante basin in medio late leviter utrinque oblique sat fortiter impresso, abasi antrorsum sinuatim angustato, basi bisinuata, angulis posticis subacutis vix extrorsum directis; elytris sat fortiter sat crebre punctulatis, punctulato striatis, puncturis in striis et in interstitiis inter se sat æqualibus; antennis quam corporis dimidium paullo longioribus, articulo 3° quam 4us subbreviori; corpore subtus sat fortiter punctulato. Long., $3\frac{3}{5}$—$4\frac{1}{5}$ l.; lat., 1—$1\frac{1}{5}$ l.

The sexual differences in this species seem very slight. The hind-body of the male is much narrower and more convex transversely than that of the female, and the eyes in the same sex are perhaps a trifle more approximated; in both sexes the interval between the eyes is very much less wide than either eye as seen from above. The colours and markings of this species are considerably like those of an *Apellatus*. The vitta on each elytron dilates hindward to the extent of filling up the apical portion but (in all the examples I have seen) leaves the suture and margin narrowly red.

Victoria; Alpine district.

H. rufa, sp. nov. Modice elongata; sat parallela; sat convexa; minus nitida; pilis erectis sat brevibus densius vestita; rufa, antennis pedibus abdomineque plus minusve dilutioribus, nonnullis exemplis capite obscuriori; hoc fortiter sat crebre punctulato; oculis subapproximatis; prothorace quam longiori fere sesqui latiori, late vix perspicue canaliculato, ante basin utrinque obscure impresso, crebre fortiter punctulato, antice quam postice paullo angustiori, lateribus sat rotundatis, basi leviter bisinuata, angulis posticis obtusis; elytris crebre subfortiter punctulatis, leviter striatis; antennis quam corporis duæ partes paullo longioribus, articulis 4-10 (præsertim 4) leviter compressis intus subserratis, 3° quam 4us paullo breviori; corpore subtus sparsim minus fortiter punctulato, segmento ultimo ventrali late longitudinaliter impresso. Long., $3\frac{3}{5}$ l.; lat., 1 l.—$1\frac{1}{5}$ l. (vix).

A puzzling species, very unlike *H. carbonaria*, Germ., but in almost every point of difference connected with it by intermediate species. The third antennal joint shorter than the fourth (for example) is certainly suggestive of generic distinction, but this insect cannot, I think, be separated generically from *H. fusca*, in

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which the proportion of the third and fourth joints is reversed. The interval between the eyes is considerably less than the width of either eye as seen from above. The apical joint of the antennæ is considerably longer than the tenth. The sexual distinctions seem very slight; in the male the intercoxal process of the hind body is conspicuously elevated. The metasternum is extremely tumid, and is in many examples considerably darker in colour than the hind-body.

S. Australia; near Adelaide.

H. tenebrioides, sp. nov. Elongata; sat parallela, pone medium subdilatata; modice convexa; sat nitida; pilis brevibus erectis sparsim obscure vestita; cœruleo-nigra, prothorace læte cyaneo-micans, sutura obscure rufescenti, labro palpis et antennarum apice plus minusve testaceis, pedibus picescentibus; capite crebrius sat fortiter punctulato; oculis sat approximatis; prothorace fere subgibboso, leviter transverso, sparsius sat fortiter punctulato, a basi antrorsum sat fortiter rotundato-angustato, lateribus ante basin leviter sinuatis, dorso antebasin transversim 3-foveolato, basi bisinuato, angulis posticis rectis leviter extrorsum prominulis; elytris crebre sat fortiter punctulatis, sat fortiter striatis, interstitiis transversim rugulosis; antennis ut *H. lugubris*.

Maris tibiis anticis infra basin intus angulatim dilatatis. Long., $6\frac{1}{2}$ l.; lat., $2\frac{1}{6}$ l.

A handsome and distinct species of facies suggestive of *Tenebrio*.

South Australia; basin of Lake Eyre.

H. princeps, sp. nov. Elongata; subparallela, postice acuminata, sat convexa; minus nitida; pilis brevibus suberectis sparsim obscure vestita; cœruleo-nigra, prothorace læte cyaneo-micans; capite sparsius fortius punctulato; oculis approximatis; prothorace fere ut *H. lugubris* sed margine antico bisinuato, in medio manifeste rotundato-producto, sparsim fortiter punctulato; elytris sat fortiter sparsius punctulatis, subtiliter striatis, striis subtiliter punctulatis, interstitiis perplanis, margine laterali pone humeros antice profunde sulcato, sulco foveis magnis profundis instructo; antennis fere ut *H. lugubris* sed articulo 3° magis elongato. Long., $8\frac{1}{2}$ l.; lat., 3 l.

I do not find any character decisively indicating the sex of my example of this fine species, which probably points to its being a female, as it is probable that the anterior tibiæ of the male are toothed within. The extremely fine striæ of the elytra, their punctures much finer than those of the interstices, and the absolute flatness of the interstices, together with the remarkable

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sulcus with its large foveæ on the sides of the elytra, render this a very distinct insect. It is perhaps just possible (but I think very improbable) that this is a var. of *(Allecula) elongata*, Macl. It is also near *Lisa singularis*, Haag-R., which, however, *inter alia*, has the prothorax "sat dense punctatus."

N. Territory of S. Australia.

H. nitida, sp. nov. (Mas.). Elongata; subparallela, postice sat acuminata; sat convexa; nitida; pilis sat elongatis erectis sparsim vestita; nigra, vix cyaneo-micans, labro antice ferrugineo; capite sat crebre sat fortiter punctulato, oculis subcontiguis; prothorace leviter transverso, subquadrato, a basi antrorsum leviter arcuatim angustato, sparsim sat fortiter punctulato, fere subgibboso, ante basin transversim 3-impresso (impressione media minus perspicua), margine antico bisinuato in medio sat fortiter rotundato-producto, angulis posticis subrectis extrorsum vix prominulis; elytris leviter striatis, striis punctulatis (puncturis anticis sat magnis subquadratis retrorsum gradatim obsoletescentibus), interstitiis sat planis sparsim punctulatis; antennis (exempli typici) carentibus, sinedubio fere ut feminæ, sed paullo magis elongatis; tibiis anticis inmedio intus rotundatim dilatatis. Long., 7 l.; lat., 2 l.

Feminæ oculis paullo minus approximatis, prothorace paullo magis crebre punctulato, tibiis anticis simplicibus, antennis quam corporis dimidium vix longioribus, articulo 3° quam 4us sat longiori; corpore (? abraso) haud piloso. Long., 8 l.; lat., 3 l.

The antennæ (of the female) are in every respect extremely like those of the same sex of *H. carbonaria*, Germ. The punctures in the striæ on the elytra are much larger than those of the interstices.

N. Territory of S. Australia.

H. fusca, sp. nov. Sat elongata; sat parallela; sat nitida; pilis brevibus erectis densius vestita; fusca, elytris suturam versus tibiis tarsisque plus minusve rufescentibus; capite sat crebre fortiter punctulato; oculis approximatis; prothorace quam longiori plus quam sesquilatiori, antice quam postice vix angustiori, quam caput parum latiori, late leviter canaliculato, ante basinutrinque impresso, crasse sparsim punctulato, lateribus leviter arcuatis ante basin bisinuatum subsinuatis, angulis posticis rectis; elytris sat crasse minus crebre punctulatis et subtiliter punctulato-striatis; antennis quam corporis duæpartes vix brevioribus, articulo 3° quam 4us sequentesque parum longiori; segmento ventrali apicali fovea mediana instructo; corpore subtus sparsim punctulato. Long., $3\frac{3}{5}$ l.; lat., $1\frac{1}{5}$ l.

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Notable for the generally coarse character of the puncturation, which is at its maximum on the prothorax. The striæ on the elytra are punctulate, but their punctures are little conspicuous, being not much different in character from those of the general surface. I suspect my two examples are both males, and it is probable that the apical ventral segment in the female is less conspicuously foveated.

S. Australia; near Port Lincoln.

BARYCISTELA (gen. nov.).

Caput breve; mandibulæ apice bifidæ; palporum maxillarium articulus secundus robustus quam tertius duplo longior, apicali longitudine sat æqualis; hoc magnus triangulum æquilaterum formans, labialium forma similis sed minor; oculi (maris?) parum approximati; antennæ elongatæ sat graciles, articulus 3us quam 4us paullo brevior; prothorax fortiter transversus, quam elytra vix angustior basi subbisinuatus; femora subtus sulco elongato impressa; tibiæ anticæ apice extus dilatatæ; suturæ ventrales apicales 2 valde impressæ ad latera sat fortiter retrorsum directæ; prosternum inter coxas valde elevatum; corpus robustum, latum, alatum.

Agreeing with *Homotrysis* in the possession of the characters that would entitle to a place in *Allecula*, as tabulated by Lacordaire (viz., short bifid mandibles, head free in repose, anterior coxæ not contiguous, tarsi lamellated, &c.), this genus differs from *Homotrysis* (including *Hybrenia* and *Lisa*) by its totally different build, which is very exceptionally robust for the family, recalling somewhat the appearance of *Dascillus;* also by the extremely strong and abrupt elevation of the hind part of the prosternum, which is considerably more marked than in *Homotrysis tristis*, Germ., in the very much longer sulcus running inward from the apex on the underside of the femora, much shorter third joint of the antennæ, &c. From *Nocar* it differs, *inter alia*, by its much more robust and parallel form, the hind part of the prosternum very much more elevated, &c.; from *Scaletomerus* by the last of the characters just named, by greater robustness, very different apical joint of maxillary palpi, prothorax scarcely narrower than the elytra, &c.; and from all the above by its anterior tibiæ dilated externally at the apex, this latter character approximating the present genus to the Hawaiian *Labetis*, to which it really bears a good deal of resemblance, though differing in important characters (*e.g.*, the structure of the palpi and femoral sulci). The example before me has lamellæ on the third and fourth joints of the front tarsi and the fourth of the intermediate, but not a well-defined one on the hind tarsi.

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B. robusta, sp. nov. Minus nitida; modice convexa; sat lata; sat parallela; sparsim breviter pubescens; obscure rufo-brunnea, metasterno medio picescente, antennis palpis pedibusque dilutioribus; capite brevi rugulose sat crasse punctulato; prothorace quam longiori fere duplo latiori, antice parum angustato, postice ante basin utrinque impresso, confertim aspere punctulato, lateribus sat rotundatis, angulis anticis nullis plane rotundatis, angulis posticis suberectis; elytris subfortiter minus crebre punctulatis, subtiliter striatis; sternis fortiter minus crebre (prosterni lateribus crasse rugulose), abdomine sparsim subtiliter, punctulatis.

Maris (?) antennis quam corporis dimidium longioribus. Long., 4 l.; lat., $1\frac{4}{5}$ l.

It is impossible to be certain that this may not be one of the numerous Australian species attributed to *Allecula*, and described in a few words, without reference to structural characters. The brief description of *A. Mastersi*, Macl., for example, might possibly be founded on it.

Queensland; sent by F. M. Bailey, Esq.

NOCAR (gen. nov.).

Caput antice sat breve; mandibulæ apice bifidæ; palporum maxillarium articulus secundus sat brevis; apicalis late, labialium minus late, triangularis; oculi magni modice approximati; antennæ sat graciles modice elongatæ, articulus 3us quam 4us vix longior; prothorax fortiter transversus, a basi antrorsum fortiter rotundatim angustatus, basi bisinuatus; corpus ovale, alatum; suturæ ventrales apicales 2 ad latera subito valde retrorsum directæ.

This new generic name is necessary to distinguish certain small *Cistelidæ* which agree with *Homotrysis* in the possession of wings, mandibles bifid at the apex, lamellated tarsi, widely triangular apical joint of maxillary palpi, &c., but differ very much in form, being oval, the four posterior femora scarcely long enough to extend laterally beyond the margin of the elytra. The eyes are larger and more approximate than in the typical *Homotrysis* (*H. tristis*, Germ.), the third joint of the antennæ is relatively shorter, the head is very much smaller in comparison of the other parts, being less than half as wide as the base of the prothorax; the general surface is only slightly nitid, and is clothed with very fine adpressed pubescence—not erect pilosity; and the apical ventral segment does not bear a fovea. Joints 3-11 of the antennæ are of very uniform length, joints 3 and 4 being only a little longer than the rest.

From *Allecula* and *Cistela* this genus is distinguished, *inter alia*,

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by the comparatively approximate eyes (the interval between which is much less than the width of each eye as seen from above) and the strongly bisinuate base of the prothorax.

The species which I described as *Cistela australica* (Proc. L. Soc., N.S.W., 1888, p. 1,441), in the collection made in the N. Territory by Mr. J. P. Tepper, appears to belong to this genus, though its condition does not allow a very satisfactory examination of all details. The genus is very near *Cistela*, but I think the characters mentioned above (especially the first) together with the distinct lamella under the penultimate joint of each tarsus justify its separation.*

N. latus, sp. nov. Convexus; sat late ovalis; supra minus nitidus; pube fulva vestitus; obscure brunneus vel rufus, antennis palpis pedibusque plus minusve dilutioribus; capite prothoraceque confertim aspere sat fortiter punctulatis; hoc quam longiori vix duplo latiori, basi fortiter bisinuata quam margo anticus duplo latiori quam elytrorum basis haud angustiori, angulis posticis acutis leviter retrorsum directis; elytris sat crebre subfortiter punctulatis, punctulato-striatis, interstitiis subconvexis, lateribus sat arcuatis; corpore subtus nitido sparsim punctulato, exemplis nonnullis piceo-maculato. Maris oculis quam feminæ paullo magis approximatis. Long., $3\frac{1}{2}$ l.; lat. $1\frac{1}{2}$ l.

I judge from the brief description of *Allecula Mastersi*, Macl., that it is a member of this genus, and very nearly allied to this species. As, however, its habitat is very different (Gayndah, Qu.), and the description does not agree altogether with the S. Australian form (calling the pubescence "semi-erect," and the tarsi differently coloured from the tibiæ), I have little doubt of its distinctness.

S. Australia and Victoria; under bark of Eucalyptus.

N. debilis, sp. nov. Præcedenti valde affinis, sed minor, minus latus, antennis apicem versus infuscatis fere nigris, elytrorum striis apicem versus obsoletis; corpore subtus magis crebre magis fortiter punctulato. Long., $2\frac{3}{5}$ l.; lat., 1 l.

Certainly very close to *T. latus*, but the characters mentioned above, its uniformly smaller size, narrower form, elytral striæ almost entirely failing near the apex (in *T. latus* they are almost deeper near the apex than elsewhere), and the evidently stronger

* Since writing the above I have examined the types of various *Cistelidæ* in the Macleay Museum. I find that *Cistela depressiuscula*, Macl., is certainly congeneric with my *Nocar latus* and is extremely close to it specifically. Unfortunately I had not an example of *N. latus* with me, so could not compare the two to determine whether they are specifically distinct.

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and closer puncturation of the underside are evidently distinctive of a species.

S. Australia; Yorke's Peninsula, under bark of Eucalyptus.

N. simplex, sp. nov. *T. lato* affinis, sed minor, multo minus late (quam *T. debilis* minus late) ovalis, pedibus antennisque magis obscuris, oculis multo minus approximatis, elytris haud striatis, prosterni episternis fortiter rugulosis. Long., $2\frac{1}{5}$ l.; lat., $\frac{9}{10}$ l.

The distance between the eyes is a little greater than the width of either eye as seen from above (probably the eyes of the male are a little more approximated). The non-striated elytra (even the juxta-sutural stria being scarcely indicated) at once distinguish this species, which has a facies suggestive of *Choleva*.

S. Australia; taken by Mr. McDougal near Edithburgh.

SCALETOMERUS (gen. nov.).

Caput paullo elongatum; mandibulæ apice bifidæ; palporum maxillarium articulus secundus tertio sesquilongior apicali longitudine æqualis; hic sat late securiformis, labialium sat late triangularis; oculi maris modice feminæ parum approximati; antennæ modice robustæ, minus elongatæ, articulus 3us quam 4us longior; prothorax sat transversus, basi leviter bisinuata; corpus alatum minus elongatum; femora subtus sulco elongato impressa; suturæ ventrales apicales 2 valde impressæ ad latera subito valde retrorsum directæ; facie *Harpalides* simulans.

The apical joint of the maxillary palpi is elongate, but not nearly so narrow as that of *Anaxo*, the longest of its three sides being that which continues the external outline of the palpus. The resemblance to a *Harpalid* is very striking. The head is evidently more prolonged in a beak than that of *Nocar*.

S. harpaloides, sp. nov. Nitidus; modice elongatus; minus convexus; glaber; rufo-testaceus, elytris (sutura excepta) abdomineque infuscatis; capite prothoraceque subtilius minus crebre punctulatis; hoc quam longiori sesquilatiori, postice quam antice sat latiori, vix perspicue canaliculato, lateribus modice arcuatis, basi bisinuata, angulis posticis subacutis, retrorsum vix subproductis; elytris subtiliter striatis, striis sat subtiliter sat crebre punctulatis, interstitiis vix planis subtilius sparsim punctulatis; antennis elytrorum basin paullo superantibus; corpore subtus (præsertim abdomine) sublævigato.

Maris oculis sub approximatis; tibiis anticis intermediisque in medio intus sinuato-dilatatis; segmento ventrali apicali excavato. Long., 3 l.; lat., $1\frac{1}{5}$ l. (vix).

S. Australia; MacDonnell Ranges.

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S. proximus, sp. nov. Præcedenti valde affinis; capite prothoraceque piceis, prothoracis angulis posticis paullo minus acutis; maris tibiis simplicibus, segmento apicali ventrali sat leviter impresso. Long., 3 l.; lat., $1\frac{1}{5}$ l. (vix).

The present species might well pass for a dark form of the preceding, were it not for the different male characters, which are almost confined to the somewhat closer approximation of the eyes, the tibiæ being quite like those of the female, and the apical ventral segment being only lightly impressed, instead of bearing a large deep round fovea.

S. Australia; basin of Lake Eyre.

HEMICISTELA (gen. nov. ? hujus fam.).

Caput sat breve; mandibulæ apice acuminatæ (?); palporum maxillarium articulus secundus robustus quam tertius paullo longior, apicali longitudine parum brevior; hic sat magnus securiformis, labialium obovatus, vix triangularis; oculi (maris ?) inter se sat distantes; antennæ modice robustæ quam corporis dimidium vix longiores, articulo 3° quam 4us paullo breviori; prothorax sat transversus, quam elytra sat angustior, basi haud bisinuata; femora subtus sulco minus elongato impressa; tibiæ intermediæ (? maris solum) intus ante apicem emarginata; prosternum inter coxas haud elevatum, his illum sat fortiter superantibus; unguiculis vix manifeste pectinatis; corpus oblongo-ovale.

The species for which I propose this name is a very puzzling one which does not appear to me to fit quite satisfactorily into any known family. It has very decidedly the general appearance of a *Cistelid*, and I think the possession of the following characters in combination will justify its being placed among the *Cistelidæ*, viz., tarsi heteromerous, and furnished beneath with well-defined *lamellæ* (two on each of the four anterior, and one on the posterior), anterior coxal cavities closed behind. Nevertheless the claws are not distinctly pectinated within (under a microscope the inner outline seems to be finely crenulated), and the prosternal process, instead of being elevated to the level of the coxæ, passes between the coxæ on the general plane of the surface, the coxæ rising (but not very strongly) above its plane on either side. The apical spines of the tibiæ are very short and slender. The singular emargination of the intermediate tibiæ close to the apex of the inner margin is very likely to be sexual. The penultimate ventral segment is about the same size as that preceding it. The apical joint of the maxillary palpi is much like that of *Homotrysis tristis*, Germ., in shape, but is relatively smaller.

My unique type of this insect has its mandibles tightly closed together, so that I have been unable to examine them as exactly

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as I could wish. I can only see *one* apical joint, but from the shortness of the head, and the evident resemblance in most characters to genera with bifid mandibles rather than to *Atractus* and its allies, I cannot help thinking it probable that this species really has bifid mandibles.

H. discoidalis, sp. nov. Subnitida; minus convexa; oblongo-ovalis; fere glabra; testacea, capite postice palporum apice antennis (basi excepta) prothoraceque rufo-infuscatis, elytris (plaga magna elongata discoidali utrinque livida excepta) abdominisque parte apicali nigris; capite prothoraceque subcoriaceis minus crebre leviter punctulatis; hoc sat transverso antice vix angustato, medio ante basin foveato; elytris punctulato-striatis, interstitiis sat planis sparsim sat fortiter punctulatis, striarum punctis quadratis sat crebris. Long., 2 l.; lat., $\frac{7}{10}$ l.

The livid patch on each elytron nearly reaches the base, but does not extend hindward much beyond the middle, and is somewhat narrowed from the base hindward. The size, color, and markings give this little species some resemblance to a *Lebiid* (*e.g.*, *Ectroma civicum*, Newm.).

Victoria; Alpine district; a single example under bark.

PYTHIDÆ.

The genus characterised below as *Trichosalpingus*, though much like *Salpingus* in form, is really an extremely anomalous type which will not fit exactly into any family as characterised by M. Lacordaire. It agrees with the *Pythidæ* in the following characters:—Front coxæ contiguous, but little exserted and open behind, hind coxæ separated and strongly transverse, eyes lateral entire, pronotum much narrower than the elytra at its base, not separated from the flanks of the prosternum, prosternum truncate in front; but it differs in the structure of its tarsi, the penultimate joint of which is prolonged beneath the claw-joint, while the claws are strongly thickened at the base.

Some one or more of the above-mentioned characters are inconsistent with a place in any other of the known families of *Heteromera*.

TRICHOSALPINGUS (gen. nov.).

Mentum transversim subquadratum; palporum articulus ultimus ovalis; genæ (?) subtus spiniformes; oculi sat magni prominentes sat fortiter granulati; caput sat breve antice late breviter rostriforme (fere ut *Salpingi*); antennæ breves subfiliformes; prothorax sat quadratus; elytra sat elongata; pedes breves, femoribus tibiisque fere ut *Salpingi*; tarsi heteromeri, articulo penultimo subtus producto, posticorum

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articulo 1° quam 4us sat longiori; unguiculi ad basin incrassati; prosterno antice truncato; corpus subtiliter pubescens.

T. brunneus, sp. nov. Oblongo-ovatus; minus nitidus; subtiliter pubescens; crebre (capite minus crebre subtiliter subaspere) punctulatus; obscure brunneus, capite prothorace antennis palpis pedibus abdomineque rufescentibus; antennis prothoracis basin vix attingentibus; prothorace quam caput vix latiori, sat transversim quadrato, ante basin utrinque fovea profunda impresso; elytris quam prothorax basi multo latioribus, a basi longe ultra medium leviter dilatatis. Long., 2 l.; lat., $\frac{3}{4}$ l.

Victoria; Alpine district.

NOTOSALPINGUS (gen. nov.).

Generi præcedenti differt genis haud spiniformibus, oculis multo minoribus, capite antice manifeste magis rostriformi, antennis apicem versus paullo incrassatis (nec clavatis), prothorace (speciei typicæ) cordiformi, tarsorum articulis (apicali excepto) brevibus, penultimo quam præcedentes multo angustiori haud subtus producto, articulis basalibus subtus hirsutis, corpore fere glabro capillis erectis sparsim vestito.

I think this genus will be sufficiently distinguished from those previously characterised in the family by its head resembling that of *Salpingus*, in combination with tarsi of which the apical joint is as long as all the rest together, the penultimate much narrower than the preceding joints, and the first not much longer than the second, and antennæ not clavate.

N. ornatus, sp. nov. Elongato-ovalis; sat nitidus; fortiter minus crebre (capite sat crebre) punctulatis; brunneus vix ænescens, piceo-umbratus, elytris testaceo-variegatis, palpis antennarum basi pedibusque plus minusve testaceis; prothorace transverso, ab apice retrorsum sinuatim angustato, lateribus sparsim obscure denticulatis; capite quam prothorax paullo, hoc quam elytra magis quam paullo, angustioribus. Long., $\frac{4}{5}$—$1\frac{1}{5}$ l.; lat., $\frac{3}{10}$—$\frac{4}{5}$ l.

The base of the prothorax is testaceous. The testaceous markings on the elytra consist of a wide vitta commencing on each shoulder and running towards the suture, which it nearly but not quite reaches at about a quarter the length of the latter from the scutellum; at that point it becomes much narrower, and continues parallel with the suture to about the middle of the length of the elytra, where it abruptly dilates and ends; there is also an indistinct testaceous blotch on each elytron near the apex. The above described testaceous markings are fairly

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(in some examples very) well defined ; the rest of the surface has a mottled appearace owing to the brownish colour being here and there obscurely darker or lighter. The punctures on the elytra have a very evident tendency to run in rows.

The antennæ do not quite reach back to the base of the prothorax ; their joints do not differ much *inter se*, but the first four are evidently more slender than the rest, and the apical four or five again show a slight increase in stoutness.

S. Australia ; near Port Lincoln ; under bark of Eucalyptus.

NEOSALPINGUS (gen. nov.).

A. Trichosalpingo differt fere ut præcedens sed antennarum articuli ultimi 3 clavam abruptam formant.

This genus differs from *Notosalpingus* very much as *Lissodema* differs from *Salpingus;* from *Lissodema* it is at once separated by its very different tarsi, which are shorter and stouter, with the apical two joints conspicuously more slender than the rest, which are densely clothed beneath with long hairs, the basal joint of the hind tarsi being scarcely longer than the second.

N. corticalis, sp. nov. Oblongo-ovatus ; nitidus ; obscure viridiæneus, corpore subtus piceo, antennarum basi palpis pedibusque rufis ; capite prothoraceque crebre subtilius punctulatis, puncturis obscure longitudinaliter strigatim positis ; prothorace leviter transverso, pone apicem rotundato dilatato, retrorsum sinuatim angustato, disco late longitudinaliter impresso, lateribus haud denticulatis ; elytris leviter striatis, striis sat subtiliter minus crebre (interstitiis hic illic sparsissime) punctulatis. Long., 1 l. ; lat., $\frac{2}{5}$ l.

The antennæ set back would about reach the base of the prothorax ; their club is very abrupt, the first two of its joints almost transverse, the third a trifle longer. The prothorax is punctured a trifle less finely and closely than the head ; its surface is noticeably uneven, having some obscure transverse impressions in addition to the longitudinal one ; near the base on either side is a little elevated pustule.

Superficially very like *Salpingus hybridus*, Er. (to which a specimen from Tasmania, given me by Mr. J. J. Walker, I have no doubt pertains) ; but the latter appears to be a genuine *Lissodema*, and also differs, *inter alia*, by its longer antennæ.

S. Australia ; under bark near Port Lincoln.

N. dentaticollis, sp. nov. Oblongo-ovatus ; nitidus ; obscure brunneus vel fere castaneus, vix ænescens, corpore subtus antennarum basi palpis pedibusque brunneo-testaceis ; capite subtilius, prothorace sat fortiter, crebrius punctulatis ; hoc sat transverso pone apicem sat dilatato, retrorsum

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angustato, medio obscure impresso, lateribus sat fortiter sparsim denticulatis; elytris haud striatis minus fortiter sat crebre punctulatis, puncturis subseriatim positis. Long., $\frac{4}{5}$—1 $\frac{1}{5}$ l.; lat., $\frac{3}{10}$—$\frac{3}{5}$ l.

Very distinct by the well-defined denticulations (about six in number) on each side of the prothorax. The antennæ seem a trifle longer than those of *N. corticalis*.

S. Australia; under bark near Port Lincoln.

LISSODEMA.

L. frigidum, sp. nov. Elongato-ovale; nitidum; obscure cupreo-æneum, antennarum basi palpis pebibusque testaceo-rufis; capite subtilius sat crebre, prothorace magis fortiter minus crebre, punctulatis; hoc vix transverso, obscure irregulariter impresso, pone apicem leviter dilatato-rotundato et retrorsum subsinuatim angustato, lateribus sparsim sat fortiter denticulatis; elytris leviter striatis striis subtilius minus confertim punctulatis, interstitiis sparsissime seriatim punctulatis. Long., 1 l.; lat., $\frac{2}{5}$ l.

The elongate slender tarsi of this species seem to forbid its generic association with any of those described above. I do not observe any character, however, inconsistent with a place in *Lissodema*. The denticulate sides of its prothorax will at once distinguish it from *L. hybridum*, Er.

Victoria; under bark on one of the higher mountains.

LAGRIIDÆ.

OMMATOPHORUS.

O. Mastersi, Macl. I have recently had the opportunity of examining the type of this species, and now (through the courtesy of Mr. Masters) possess an example. Sir W. Macleay was wrong in referring it to the *Lagriidæ* (he did so only with hesitation) as it is certainly a *Cistelid*. Its anterior coxal cavities are closed behind and its claws are strongly pectinated. It is extremely close to the species I have called "*Homotrysis rugulosa*, Boisd.?" (vide supra), scarcely differing from it except in the eyes of the male, being absolutely contiguous and the prothorax a little less sparsely and more strongly punctulate.

PEDILIDÆ.

MACRATRIA.

The following species seems to me capable of being referred to *Macratria* without being likely to cause confusion. M. Lacordaire places this genus in the *Pedilides*, which he separates from the *Anthicides* on the ground of their hind coxæ being contiguous or

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nearly so, but later writers have found the distinction unworkable. From its reference by M. Lacordaire to *Pedilides* I presume that *Macratria* has the hind coxæ at least less separated than those of *Anthicus* (though the great French author does not categorically assert that they are), and since in the present insect they are little, if at all, less widely separated than in some *Anthici*, it seems probable that this insect might need to be regarded as representing a new genus very close to *Macratria*. But as I have not a type of *Macratria* for comparison it will be better to refer it to that genus, with which it agrees in its anterior coxal cavities open behind, in its elongate serrated maxillary palpi (of which the second and third joints are strongly and angularly produced on their inner side, the third very strongly transverse), and, in fact, in all the characters mentioned by M. Lacordaire, unless it be that specified above.

The Ven. Archdeacon King (Trans. Ent. Soc., N.S.W., II., p. 2) described an insect under the name *Macratria australis* from which the species before me seems to be very distinct, although I should judge from the description that it is congeneric; but on the other hand the venerable author states that his species resembles a *Dircœa*, a resemblance so improbable in a *Macratria*, that I cannot help thinking he meant to write that its *palpi* resembled those of *Dircœa*, to which, if it is a *Macratria*, no doubt they do bear some likeness, the serrated palpi being one of the most remarkable characters of the genus according to Lacordaire.

M. Victoriensis, sp. nov. Elongata; angusta; minus nitidas griseo-pubescens; nigra, elytris antennis palpis labro tibii; tarsisque castaneis; capite quam prothorax vixangustiori crebre subtilius punctulato; prothorace quam latiori sat longiori, retrorsum sat æqualiter arcuatim angustato, postice leviter canaliculato, confertim ruguloso; elytris coriaceis basi utrinque subgibbosis, quam prothorax sat latioribus, leviter striatis, striis leviter subcrasse punctulatis; antennis prothoracis basin vix attingentibus, articulis apicalibus 3 elongatis leviter incrassatis ultimo præcedentibus 2 conjunctis longitudine æquali.

Maris (?) abdominis segmento ventrali apicali fovea magna ovali instructo. Long., $1\frac{4}{5}$ l.; lat., $\frac{1}{2}$ l.

Victoria; Alpine district; on flowers.

ANTHICIDÆ.

It is with considerable hesitation that I refer to the *Anthicidæ* the very anomalous little insects which follow. Their facies is suggestive of *Xylophilus*, but the very distinct separation of

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their hind coxæ forbids their being referred to the *Pedilidæ*. The remarkable tarsal structure may, perhaps, be thought equally inconsistent for an *Anthicid*, but I do not know any family of *Heteromera* with which it is not also inconsistent. The prosternum is excessively narrow (a mere line) in front of the front coxæ, which are widely open behind. As I have both sexes of the first species described, there is no doubt of its being genuinely heteromerous. If these insects had been before M. Lacordaire, when he wrote the "Genera des Coléoptères," I imagine he would have regarded them as belonging to a distinct family near the *Anthicidæ*.

I have before me six examples in all, which agree in the following principal characters:—Head not joined to prothorax by a distinct neck, eyes very coarsely granulated, pronotum not separated from flanks of prosternum by a distinct margin, anterior coxæ prominent, contiguous, nearly reaching the front of the prosternum, and widely open behind, hind coxæ not contiguous, tarsi heteromerous (the antepenultimate joint produced beneath in a kind of filament, the penultimate very small nodiform). These six examples pertain to five species, and it seems necessary to arrange the five species in three genera, in the first of which the eyes are very large, but not projecting much beyond the general contour of the head, and the intermediate tarsi long and slender; in the second the eyes are much smaller and conspicuously prominent, while the intermediate tarsi are very much shorter and stouter; and in the third the eyes are very prominent indeed, while the intermediate tarsi are almost as long and slender as in the first.

I presume these insects are rare, as the only examples I have seen referable to any of the genera are those described below.

SYZETON, gen. nov. (? hujus familiæ).

Palporum articulus apicalis late triangularis, maxillarium permagnus; caput breve, prothoraci sat late applicatum; oculi magni sat grosse granulati; antennæ validæ filiformes; prothorax transversus ad latera haud marginatus; pedes sat elongati; tarsorum articulus penultimus parvus nodiformis; tarsi posteriores 4 quam tibiæ vix vel paullo longiores, horum articulus primus quam ceteri conjuncti vix brevior vel manifeste longior; coxæ anticæ contiguæ prominentes postice apertæ, intermediæ posticæque modice approximatæ; processus ventralis inter coxas acutus; sutura ventralis prima in medio fere obliterata; corpus alatum pubescens; unguiculi simplices; tibiarum apice vix spinoso.

S. lætus, sp. nov. Oblongo-ovalis; subnitidus; subtus pubescens; supra pilis erectis vestitus; subtus piceus, supra læte rufo-

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testaceus, capite antennis et elytrorum fascia lata mediana apiceque nigropiceis, pedibus anticis rufis posterioribus piceis (coxis femorum basi tarsisque rufis); supra sat fortiter (capite prothoraceque quam elytra paullo minus fortiter) minus crebre punctulatus, capite prothoraceque (quam elytra sat angustioribus) inter se latitudine æqualibus; hoc transverso postice leviter angustato, lateribus vix arcuatis.

Maris segmento ventrali apicali fovea leviter impresso; tibiis anticis apice manifeste arcuatis; oculis supra sat approximatis. Long., 1 l.; lat., $\frac{3}{10}$ l.

The antennæ of the male are a little more than half the length of the body, stout, and of almost even thickness, the second joint small, the eleventh twice as long as the tenth, the rest about equal in length, *inter se*, none of them transverse; those of the female are a little less than half the length of the body, and are very stout, joints 4-11 of even width and considerably wider than the basal 3 joints, 4-10 all transverse, 11 considerably longer than 10. Joints 1 and 3 are evidently longer than 4-10, joint 2 is small. The basal joint of the hind tarsi is about half again as long as (and much stouter than) all the others together; that of the intermediate is about equal to the apical four joints together. The antepenultimate joint is considerably produced below the following joints but does not appear to be lamellated.

Victoria; Alpine district, on flowers.

S. lateralis, sp. nov. Ovalis; minus parallelus; subnitidus; subtus pubescens; supra pilis erectis vestitus; rufo-testaceus, antennis (basi apiceque exceptis) capite prothorace et elytrorum macula utrinque laterali (hac vix ante medium posita) piceo-nigris, geniculis vix infuscatis; supra sat fortiter (capite prothoraceque quam elytra paullo minus fortiter) sat crebre punctulatus; capite transversim subquadrato quam prothorax sublatiori; hoc transverso antice sat angusto mox pone apicem latiori, lateribus (parte antica excepta) fere parallelis; elytris quam caput sat latioribus.

Mas latet. Long., $1\frac{1}{2}$ l.; lat., $\frac{1}{2}$ l.

Apart from the difference in colour and markings, the present species differs from the preceding, *inter alia*, in the structure of the antennæ, the basal joints of which are not noticeably more slender than the rest, nor any of the joints except the tenth transverse, the second joint, moreover, being not very much smaller than the first and third. The antennæ are about as stout as those of *S. lætus* but a trifle longer; their testaceous apical joint is very conspicuous. My example of this species

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seems to be a female, although its antennæ are more like those of the male of *S. lætus*.

Victoria; Alpine district.

SYZETONINUS, gen. nov. (? hujus familiæ).

A genere *Syzeton* differt oculis minoribus magis prominentibus antennis magis gracilibus.

In other respects the characters mentioned above for *Syzeton* may be read as applying to this genus.

These characters may appear slight as generic, but the difference in the structure of the head and antennæ certainly seem to me more than specific. In *Syzeton* the eyes are extremely large, but are contained within the head (so to speak), the base of the head extending distinctly behind the eyes almost as far laterally as the widest part of the eyes, so that the head is subquadrate; in *Syzetonellus* and *Syzetoninus* the eyes are considerably smaller, but the base of the head does not extend laterally behind them, so that the head is not at all quadrate. This, together with the considerable antennal difference, gives the insects a very different facies. *Syzetoninus* differs from *Syzetonellus* in the intermediate tarsi being long and slender, like those of the hind legs, and in the less complete obliteration of the first ventral suture.

S. mundus, sp. nov. (Mas ?). Elongato-ovalis; vix nitidus; pilis brevibus adpressis minus confertim vestitus; subtus piceo-niger, capite nigro, prothorace rufo, elytris pallide testaceis macula communi basali triangulari fascia mediana undulata maculaque communi apicem insidenti piceis ornatis, antennis palpis pedibusque rufo-testaceis; capite prothoraceque sat crebre sat fortiter punctulatis; hoc transverso ante basin bifoveolato, lateribus sat arcuatis; elytris sat crebre minus fortiter punctulatis; femoribus posticis subtus dentatis. Long., 1 l.; lat., $\frac{3}{10}$ l.

The antennæ are not quite so long as half the body; they are nearly filiform, joints 1 and 2 a little stouter than the following ones, 3 quite small, 4 cylindric, 5-10 not differing much *inter se*, but gradually a little stouter, and a little more triangular in shape; 11 about twice as long as 10.

S. Australia; near Port Lincoln.

S. inconspicuus, sp. nov. (Mas.). Elongato-ovalis; subnitidus; pilis brevibus adpressis minus confertim vestitus; subtus piceo-niger, capite nigro, prothorace elytris antennarum basi pedibusque brunneis; supra sat crebre subfortiter punctulatus; prothorace quam caput angustiori, transverso, ante medium transversim canaliculato, ante basin fovea magna

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arcuata impresso, postice vix angustato, lateribus vix arcuatis; elytris pone basin arcuatim impressis; segmento ventrali apicali leviter impresso. Long., $\frac{2}{3}$ l.; lat., $\frac{3}{10}$ l. (vix).

The antennæ are considerably more than half as long as the body; the basal two joints (which are of testaceous-brown colour) are a little stouter than the rest, the first much longer than the second; 3-7 are cylindric, slightly increasing in length (3 notably the smallest of them, but evidently longer than 2), 8-10 a little stouter than the preceding joints, but not longer; 11 a little longer and stouter. The incrassation of the antennæ towards their apex is very slight, and the only joint among the apical 6 or 7 that is at all markedly different from the rest is the eleventh.

S. Australia; near Port Lincoln; under bark of *Eucalyptus*.

SYZETONELLUS, gen. nov. (? hujus familiæ).

A genere præcedenti differt oculis multo minoribus magis prominentibus, antennis magis gracilibus, pedibus minus elongatis, tarsis intermediis quam tibia multo brevioribus (illorum articulo 1° quam ceteri conjuncti sat breviori), sutura prima ventralifere tota obliterata.

In all other respects the characters mentioned above for *Syzeton* may be read as applying to this genus.

S. alpicola, sp. nov. (Mas.) Ovalis; subnitidus; pilis brevibus adpressis minus confertim vestitus subtus niger, capite palpisque nigro-piceis, antennis pedibusque rufo-testaceis, prothorace rufo-piceo, elytris brunneo-testaceis apicem versus obscurioribus utrinque fascia lata mediana picea (suturam haud attingente) ornatis; supra sat crasse subcrebre punctulatus; capite quam prothorax, hoc quam elytra, sat angustioribus; prothorace vix transverso subquadrato, lateribus leviter arcuatis; femoribus posticis valde incrassatis; tibiis posticis fortiter compresso-dilatatis ante apicem externe emarginatis; metasterno utrinque tuberculo instructo. Long., $\frac{7}{10}$ l.; lat., $\frac{3}{10}$ l. (vix.).

The antennæ are slightly longer than half the body, and are moderately stout, the basal two joints scarcely different, *inter se*, stouter than the following ones, but scarcely longer, joints 3-6 cylindric, 7-10 obconic slightly stouter, 11 evidently stouter and longer than 10, pointed at the apex.

It is probable that the dilated hind femora (almost like those of a *Haltica*) and the compressed hind tibiæ as well as the tuberculate metasternum are peculiar to the male.

The black palpi, in contrast with the rufo-testaceous antennæ, furnish a conspicuous character.

Victoria; Alpine district.

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MORDELLIDÆ.

MORDELLA.

M. Baldiensis, sp. nov. Nitida; nigra; supra, aureo, subtus argenteo, pubescens, prothorace et elytris subcœruleo-micantibus. Long., $1\frac{1}{2}$—$1\frac{3}{4}$ l.

This little species is entirely devoid of distinct markings, but the evenly-distributed pubescence has an appearance resembling a pattern which varies infinitely according to the way the light falls on it. If the insect be looked down upon from above there seems to be a line running from each shoulder to the suture at about a third of its length, and then continuing along the suture, and as the point of view is moved backward the lines from the shoulder seem to lengthen and meet the suture further from the base. From a certain point of view there seems to be a facia behind the middle, which seems to move its position as the point of view is shifted.

Victoria; on a mountain called Baldi; on flowers.

ŒDEMERIDÆ.

TRICHANANCA (gen. nov.).

Mentum antice acuminatum; palporum maxillarium articulus apicalis magnus late triangularis; labrum transversum antice subtruncatum; caput sat breve; oculi magni prominuli grosse granulati rotundati vix emarginati; antennæ prope oculos insertæ validæ minus elongatæ 11-articulatæ filiformes; prothorax cordiformis; elytra sat elongata; femora linearia sat elongata; tibiæ anticæ spinis singulis armatæ; tarsorum articulus penultimus, – anticorum articuli omnes,—subtus tomentosi, anticorum articulo basali intus valde dilatato; corpus pilis erectis vestitum.

The single spur of the front tibiæ will distinguish this genus from *Sessinia;* from *Nacerdes* (Ananca) it may be known, *inter alia*, by its round prominent coarsely-granulated eyes, and the erect pilosity with which it is clothed.

T. Victoriensis, sp. nov. Rufo-brunnea, corpore subtus pedibusque dilutioribus; supra pilis erectis vestita; nitida; crasse minus crebre punctulata, puncturis in elytris seriatim positis; prothorace (quam caput paullo latiori, quam elytra paullo angustiori) leviter transversus, pone apicem fortiter rotundato-dilatato, lateribus pone medium concavis fovea permagna utrinque posita. Long., $2\frac{1}{2}$ l.; lat., $\frac{7}{10}$ l.

The shape of the prothorax is unusual, the sides behind the middle being rendered deeply concave by the presence of a very large and deep fovea which interrupts the outline, being placed

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in the declivous lateral portion of the segment. The antennæ set back reach a little beyond the base of the prothorax; they are very stout, the basal joint the stoutest, the second short, the third about twice as long as wide (equal in length to the first), the fourth a little shorter, the fifth and following joints (except the last, which is nearly twice as long) each about equal to the third.

I am doubtful of the sex of my example of this insect, but the long apical joint of the antennæ and the lobe-like production of the basal joint of the front tarsi on the inner side are perhaps likely to be characteristic of the male.

Victoria; Alpine district.

LONGICORNES.

PHACODES.

P. validus, sp. nov. Brunneus in partibus nonnullis cinereo-pubescens; prothorace sat transverso, sparsim æqualiter (nisi disco postice) granulato, disco postice spatiis nitidis subelevatis obscure notato, lateribus æqualiter sat fortiter rotundatis; elytris pone medium cinereo-fasciatis, apice spina elongata acuta armatis, sparsim sat æqualiter tuberculis parvis obtusis ornatis, antice fortiter rugulose postice minus perspicue punctulatis; antennis (maris?) quam corpus longioribus, subtus piloso-ciliatis, parte apicali rufescenti, articulo 3° quam 4us fere dimidio longiori; pedibus cinereo-pubescentibus maculis parvis nudis ornatis; corpore subtus maculatim brunneo-cinereoque-pubescenti. Long., 13½ l.; lat., 3⅝ l.

A large and distinct species with a thin ashy pilosity over the whole upper surface; this ashy pilosity becomes in parts so dense as entirely to conceal the general sculpture (saving that the granules and tubercles protrude through it). The dense pubescence covers the head, the prothorax (except the hinder parts of the middle of the disc), the scutellum, the shoulders, and the apex of the elytra, and forms a transverse fascia a little behind the middle of the elytra; the pilosity near the hinder part of the lateral margin is also a little more dense than on the general surface, so that the fascia and apical pilosity are indistinctly connected laterally, and in that part the derm is of a somewhat reddish tone.

Compared with *P. obscurus*, Fab., this species is evidently larger and of stouter and more robust appearance, with much stouter antennæ (thin apical spines traceable quite to the eighth or ninth joint), densest parts of the pubescence much more dense, tubercles on elytra smaller and more numerous, apical spines of elytra very much longer and more developed, the third joint of

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the antennæ very noticeably shorter in proportion to the fourth joint, &c., &c.

Queensland; sent to me by F. M. Bailey, Esq.

P. bellus, sp. nov. Niger in partibus nonnullis dense albido-pubescens pedibus antennisque rufescentibus; prothorace sat transverso, fortius rugulose punctulato, latera versus sparsim granulato, disco postice spatiis nitidis elevatis notato, lateribus paullo pone medium subangulatis, ante basin subsinuatis; elytris antice fortiter rugulose postice minus perspicue punctulatis, spatiis elevatis inæqualibus nonnullis permagnis) nitidis elevatis passim ornatis, apice emarginatis bispinosis, spinis externis elongatis acutis internis brevibus obtusis; antennis maris quam corpus multo longioribus, subtus subtiliter piloso-ciliatis, a basi extrorsum gradatim rufescentibus, articulo 3° quam 4 ^{us} vix plus quam dimidio longiori; pedibus albido-pubescentibus, maculis parvis nudis ornatis. Long., 8-12 l.; lat., $2\frac{1}{8}$-$3\frac{1}{2}$ l.

The whitish-grey pubescence of the upper surface is dense and extensive enough to give the appearance of the general surface being almost white, the non-pubescent parts looking like black markings. The non-pubescent parts are mostly elevated, but the one of them that is largest in area (a wide ante-median fascia on the elytra, widest on the margin and much interrupted at the suture) is on the level of the general surface; this non-pubescent part is coarsely rugulose, the rest being lævigate or nearly so. The elevated non-pubescent spots consist of a number of small granules protruding through the pubescence on the sides of the prothorax, a short longitudinal ridge on the middle line of the prothorax (entirely in the basal half), with an irregular, somewhat lunate ridge on either side of it (these lunate ridges longer than the central one and not quite glabrous), and a number of spaces on the elytra resembling obtuse feebly-elevated tubercles, some of those in the hinder half being very much larger in area than the rest, and having a diameter scarcely less than a third of the width of the elytron. As in the preceding species the derm near the apex has more or less tendency to a reddish tone of color. In the examples before me the pubescence on the head is patchy, and in parts thin; this may be due to abrasion. Joints 3-7 of the antennæ are distinctly spined.

This species is at once distinguished from most of its congeners by the bi-spinose emargination of the apex of the elytra (though the *sutural* apex is an angle rather than a well-defined spine); and by the form of the prothorax, the sides being nearly straight from close behind the front to behind the middle, and then converging from a fairly well-defined angle somewhat sinuously to

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the base. The two examples before me are of very different size but otherwise identical. They both seem to be males.

N. S Wales; Richmond River district.

P. marmoratus, sp. nov. Brunneo-piceus, maculatim ochraceo-et albido-dense pubescens; prothorace sat transverso, subtiliter sparsim granulato, indistincte ruguloso, spatiis 9 elevatis nitidis ornato, his pube densissima ochracea circumcinctis vel totis abditis, lateribus 2-tuberculatis et pone medium sinuatim convergentibus; elytris antice fortiter minus crebre postice leviter obscure punctulatis, postice spatiis parvis nitidis vix elevatis ornatis, apice oblique truncatis, truncatura externe spina valida armata; antennis maris quam corpus sat longioribus, subtus piloso-ciliatis, articulo 3° quam 4us paullo longiori; pedibus albido-pubescentibus, maculis parvis nudis ornatis. Long., 11 l.; lat., $3\frac{1}{5}$ l.

A narrow elongate, somewhat frail-looking species for a *Phacodes;* extremely distinct by the dense ochraceous pubescence which forms conspicous markings on the head and prothorax. On the head it forms a ring round the eyes. The prothorax is very peculiarly sculptured; the lævigate spaces (which are very strongly elevated) are—a short longitudinal space in the middle near the base, and eight tubercles arranged in two transverse rows, both of which are arched hindward, so that the two inner tubercles of each row are nearer the base than the external ones, which are placed very near each other (one in front of, the other slightly behind, the middle). The external tubercles are on the margin, and interrupt the lateral edges, which converge somewhat sinuously behind them. The inner tubercles are elongate, and placed obliquely, and are much larger than the external ones; they are more or less surrounded with a dense ochraceous pubescence, which gives them an ocellated appearance. The external tubercles are completely buried in dense ochraceous pubescence. The general surface of the prothorax is very even, but bears some small sparse granules. The elytra are nearly five times as long as the prothorax; they are very evenly marbled with whitish and ochreous pubescence in patches, these patches not taking any very defined form; in some places, however, the pale pubescence forms rings round dark glabrous spots, especially along the lateral edge, and from a certain point of view there seems to be traceable a continuous zigzagged whitish line running from the middle of the margin obliquely to the suture, following the suture nearly to the apex, and then returning sinuously up the disc. The single strong sharp spine in the middle of the apex of the elytra is a notable character. Joints 3-5 of the antennæ are spined.

Australia; I am doubtful of the exact habitat.

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PHYTOPHAGA.

ORCUS.

O. cœlestis, Blackb. This name was accidentally printed "*O. cœlestris*" in Tr. Roy. Soc., 1891, p. 153, where the species is described.

EDUSA.

E. læta, Blackb. This name was accidentally printed "*E. lata*" in Tr. Roy. Soc., 1891, p. 148, where the species is described.

E. glabra, Blackb. In describing this species (*l.c.*, p. 152) I accidentally omitted to say that it is found in Queensland.

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Description of a New Species of Fabularia.

By M. C. Schlumberger.

(Communicated by Walter Howchin, F.G.S.)

[Read October 6, 1891.]

Plate XIII., figs. 5-8.

A few months ago I received from Mr. Sherborn, of London, several Foraminifera discovered by Mr. Howchin* in the Miocene beds of Muddy Creek, Victoria. Two of them seemed to be *Biloculinæ* with large longitudinal costæ and a cribriform aperture. These characters were remarkable enough, inasmuch as all known species of *Biloculina*, except *B. comata*, Brady, are smooth, and have a single tooth in the oral aperture. It was an easy matter to mistake the generic relationships of the specimens, as they were much weathered. Happily, Mr. Howchin obtained other specimens and kindly forwarded them to me. They are true *Fabularia*, and their discovery in a fresh locality is of the greatest interest, as the genus is only known by a single species from the Eocene *(Calcaire grossier)* of Paris and Egypt.

Two of the five specimens sent are sufficiently complete to allow a recognition of the external characters, and furnish material for a good drawing. The other three were used for the execution of two transverse and a longitudinal section. They all belong to the Form B,† whilst the Form A remains to be dis-

* The objects referred to by Mr. Schlumberger are the same as were briefly noted by me in "The Foraminifera of the Older Tertiary of Muddy Creek" as *Biloculina species* (Trans. Roy. Soc. S. Aus., vol. XII., p. 1), and which at the time of publication had been mislaid after having been submitted to the late Dr. H. B. Brady. The weathered condition of the test, added to the extraordinary external resemblance which this interesting object bears to the genus *Biloculina*, misled Dr. Brady, as it did Mr. Schlumberger in the first instance, and it was only on my making a section of the object that its true generic relationship was made apparent.—W. Howchin.

† Interesting researches, bearing on the internal structure of the Foraminifera, made by the eminent specialists, MM. Munier-Chalmas and C. Schlumberger, have established the fact that many Foraminifera, notably Nummulites and the Miliolidæ, possess a dimorphic structure in their respective species. The dimorphism is of a similar kind in all the genera and species which exhibit the phenomenon, and determines the size and arrangement of the initial chambers. The authors referred to above distinguish the dimorphic types as Form A and Form B. The former possesses, relatively, a very large initial chamber, whilst in the latter the initial chamber is small, and is surrounded by numerous small and gradually enlarging chambers.—W. Howchin.

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covered. It is probable that the disposition of the central chambers, which is characteristic of the latter form, will be found in the case of very small individuals, as occurs with the minute examples of *Fabularia discolithes*.

FAMILY MILIOLIDÆ.

Genus—FABULARIA, *Defrance*.

Fabularia Howchini, Schlumberger.

Form A.—Unknown.

Form B.—In a median transverse and transparent section of *Fabularia Howchini* of Form B we find in the middle an oval microsphæra surrounded by four little chambers (fig. 1).

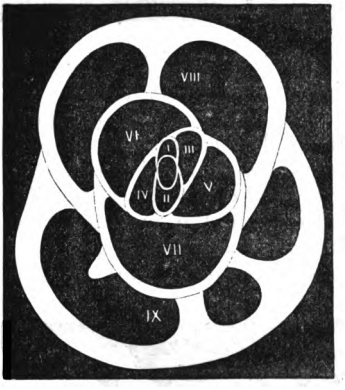

Fig. 1. *Fabularia Howchini*, Schlumberger. Form B, central portion x 100 diam.

The chambers IV. to VII. constitute successive triloculine cycles, and the last (VII.) is the first biloculine chamber. All the next are disposed alternately on the two sides of the axis of the poles in the same plane of symmetry as in the *Biloculinæ*. The first seven chambers have thin walls, leaning only against the preceding. The wall of the chamber VIII. becomes larger and produces an internal rib, extending to the wall of the chamber VI., and thus dividing chamber VIII. into two longitudinal canals. The next chamber (IX.) is divided into three canals by two internal ribs, and we remark in the greatest of them the beginning of a third rib from the inner side.

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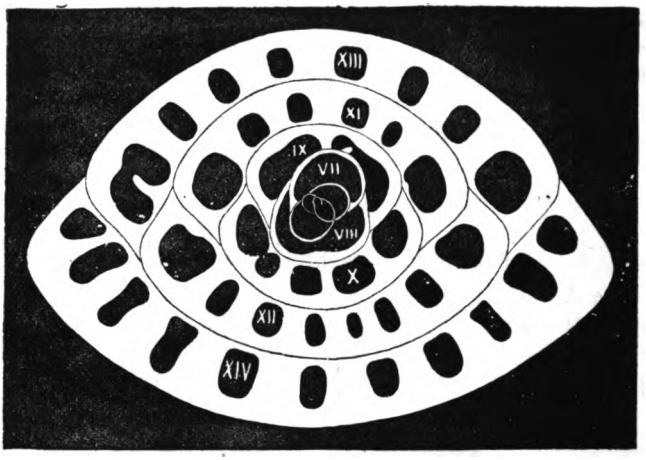

Fig. 2. *Fabularia Howchini*, Schlumberger. Form B, x 50 diam.*

The fig. 2 gives the reproduction of the complete medial section of a specimen of the Form B whose central chambers were partly destroyed. It will be seen that the successive chambers, increasing by external growth, are more and more divided into longitudinal canals by large ribs, whose calcareous deposit is extended over the outward face of the preceding chambers, so that each chamber becomes a complete investment, as in all the *Miliolidæ trematophoræ*.

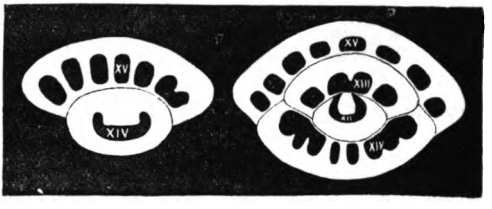

Fig. 3. Fig. 4.

Fabularia Howchini, Schlumberger. x 20 diam. Successive appearances of the preceding specimen, fig. 2.

The figs. 3 and 4 give the appearance of successive sections of the same specimen (fig. 2) taken, the former at the beginning of the operation, the latter at the quarter of the length. They show that the apertures of the chambers (XIV., fig. 3, and XIII.,

* During the preparation of this section the last chamber (XV.) was lost.

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fig. 4) are occupied by a very large tooth. The superior part of this tooth divides itself in numerous ramifications, which also divide themselves and form the wall of the preceding chamber, thus constituting a trematophore with large openings.

From the comparison of the sections fig. 4 and fig. 2, it appears that the number of the canals increases towards the middle (in length) of the chambers, *i.e.*, the chamber XIII. (fig. 4) has only three canals, the middle beginning to divide; on the median section (fig. 2) the same chamber is composed of eight canals, the one being nearly subdivided by an internal rib. A similar division is to be seen in one of the canals of chamber X. (fig. 2) by the formation of two opposite ribs, and it is therefore evident that the canals of the same chamber communicate with each other as in *Fabularia discolithes*.

Exterior characters (Plate XIII., figs. 5 to 8).—Plasmostracum free, with a regular ovoidal outline in breadth, compressed on the thickness, showing only two chambers, as in the true *Biloculinæ*. Test porcellanous, smooth, showing by transparency the disposition of the inner canals. Aperture formed by a small exhausted trematophore (fig. 8) with large perforations of various forms.

Dimensions of the figured specimen. — Length, 2mm., 7; breadth, 2mm., 8; thickness, 1mm., 2.

Locality.—The specimens which form the subject of the present note were found by Mr. Howchin in the Upper Division of the Muddy Creek Beds, Victoria, which I am informed Prof. R. Tate, of Adelaide, has referred to an age approximating to the Upper Eocene, or perhaps somewhat later.

Observation.—It is known that the chambers of *Fabularia discolithes*, Defrance, are composed of several rows of longitudinal canals of various dimensions, that the interior of the test is marked by numerous pits, and that the plasmostracum is compressed on the breadth whilst *Fabularia Howchini* has a smooth test, a single row of canals, and the compression of the plasmostracum is on the thickness.

DESCRIPTION OF PLATE XIII., figs. 5 to 8.

Fig. 5. *Fabularia Howchini*, Schlumberger. Lateral view of test. x 17 diam.
Fig. 6. " " Peripheral aspect of same specimen.
Fig. 7. " " End view showing aperture.
Fig. 8. " " Greatly enlarged view of aperture, exhibiting its cribriform character. x 40 diam.

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The Foraminifera of the Older Tertiary (No. 2, Kent Town Bore, Adelaide).

By Walter Howchin, F.G.S.

[Read March 3, 1891.]

Plate XIII., figs. 11 to 13.

In 1881 a bore was put down in the Waterworks Yard, in the eastern suburb of Adelaide, under the control of the Hydraulic Department. Prof. R. Tate F.G.S. examined the cores as the work proceeded, and has described the section in detail. (Vide Trans. Roy. Soc., S.A., vol. V., p. 40). The first 69 feet of the section consists of Pliocene Drift, underlying which, in descending order, there follow about 290 feet of Lower Tertiary beds, the upper half of which are marine, and the lower lacustrine. The marine beds are fossiliferous at intervals throughout the section. The most important fossiliferous horizon occurs at the base of the marine rocks, the latter having the lithological features of brown and green clayey sands, 23 feet in thickness. It was from the examination of material from this bed that the following Foraminifera have been determined :—

FAMILY MILIOLIDÆ.

Genus—Biloculina, *d'Orbigny.*

1. *B. ringens*, Lamk. Sub-globose examples, such as Reuss has named *B. turgida*, but has not the value of a varietal distinction. Rare.

Genus—Miliolina, *Williamson.*

2. *M. trigonula*, Lamk. Rare.
3. *M. oblonga*, Montag. Large examples, some with produced neck. Rather scarce.
4. *M. seminulum*, Linn. Rather scarce.
5. *M. Ferussacii*, d'Orb. Compressed and starved examples. Rather scarce.

Genus—Cornuspira, *Schultze.*

6. *C. involvens*, Rss. Rather scarce.

FAMILY LITUOLIDÆ.

Genus—Haplophragmium, *Reuss.*

7. *H. agglutinans*, d'Orb. The few examples obtained of this species show a considerable range as to texture. The larger

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examples are coarsely arenaceous, whilst the smaller specimens are smoother, with larger proportion of cement, and more distinct septation. Rare.

Genus—TEXTULARIA, *Defrance.*

8. *T. gibbosa*, d'Orb. Rare.
9. *T. agglutinans*, d'Orb. Moderately common.

Genus—GAUDRYINA, *d'Orbigny.*

10. *G. rugosa*, d'Orb. Rare.

Genus—BULIMINA, *d'Orbigny.*

11. *B. pupoides*, d'Orb. A few fine examples.
12. *B. pyrula*, d'Orb. Moderately common.

Genus—BOLIVINA, *d'Orbigny.*

13. *B. punctata*, d'Orb. Rare.

Genus—CASSIDULINA, *d'Orbigny.*

14. *C. subglobosa*, Br. Small examples, and rather scarce.

FAMILY LAGENIDÆ.

Genus—LAGENA, *Walker* and *Jacob.*

15. *L. lævis*, Montag. Rare.
16. *L. sulcata*, W. and J. Rare.
17. *L. squamosa*, Montag. Rare.
18. *L. hexagona*, Will. Rare.
19. *L. marginata*, W. and B. Rare.

Genus—NODOSARIA, *Lamarck.*

20. *N. (Dentalina) soluta*, Rss. Rather scarce.
21. *N.* " *obliqua*, Linné. Rare.
22. *N. scalaris*, Batsch. Rare, but includes one large example of six segments.
23. *N. verruculosa*, Neugeb. One example of four segments. Not very characteristic, as the costæ are serrate rather than tuberculated.

Genus—VAGINULINA, *d'Orbigny.*

24. *V. legumen*, Linné. Rare.

Genus—CRISTELLARIA, *Lamarck.*

25. *C. cultrata*, Mont. Rare.

Genus—POLYMORPHINA, *d'Orbigny.*

26. *P. gibba*, d'Orb. Common, often with tubulose growths.
27. *P. regina*, Br., P., and J. Rare.

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28. *P. lactea*, W. and J. Rare.
29. *P. communis*, d'Orb. Rare.
30. *P. elegantissima*, P. and J. Moderately common.

Genus—UVIGERINA, *d'Orbigny.*

31. *U. angulosa*, Will. A few very small examples.

FAMILY GLOBIGERINIDÆ.

Genus—PULLENIA, *Parker* and *Jones.*

32. *P. sphæroides*, d'Orbigny. Rare.
33. *P. quinqueloba*, Reuss. Rare.

FAMILY ROTALIDÆ.

Genus—SPIRILLINA, *Ehrenberg.*

34. *S. decorata*, Brady. In the paper on the "Muddy Creek Foraminifera" (Trans. R. Soc., S. Aus., vol. XII., p. 11), I have pointed out the slight variation which this species, as well as the next described, exhibits from the recent forms obtained from the Challenger material. The Kent Town examples possess the same varietal features as those obtained from Muddy Creek, but are in much greater numbers than in the latter district. Moderately common.
35. *S. tuberculata*, Brady. Moderately common.

Genus—DISCORBINA, *Parker* and *Jones.*

36. *D. globularis*, d'Orb. Rare.
37. *D. biconcava*, Parker and Jones. Rare.

Genus—PLANORBULINA, *d'Orbigny.*

38. *P. mediterranensis*, d'Orb. Rare.
39. *P. (?) acervalis*, Brady. A single example of very irregular acervaline growth. It does not conform to the usual character of this species, but may be only an aberrant growth.

Genus—TRUNCATULINA, *d'Orbigny.*

40. *T. lobatula*, W. and J. Rather scarce.
41. *T. Ungeriana*, d'Orb. One of the commonest species of the material.
42. *T. margaritifera*, Br., var. *Adelaidensis*, var. nov., pl. xiii., figs. 11-13. Test rotaliform, much compressed laterally, consisting of 2-3 convolutions, and about twelve chambers in all. Superior surface nearly flat. Inferior surface slightly convex. Sutural lines depressed, and on superior surface strongly curved. On the inferior side the septation is marked by irregular depressed lines, enclosing

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inflated raised areas. Peripheral margin sharp and sometimes furnished with a keel of considerable extent. Primordial region umbonate on superior surface, a feature which in very thin examples is visible on inferior side as well as superior. Surface of test ornamented on both sides (with the exception of final segment) by thickly set minute tubercles. Diameter, $\frac{1}{25}$ in.

This variety is distinguishable from the type by its greater lateral compression, fewer chambers, irregular septation on inferior surface, umbonate features of early chambers, and the general distribution of ornamentation on both faces. It is moderately common in the material from the Adelaide Bore, and is one of the most interesting species of the section. The "Challenger" localities for the species were Phillippine Islands, New Hebrides, and coast of the Korea.

Genus—ANOMALINA, *d'Orbigny.*

43. *A. ammonoides*, Reuss. Rare.

Genus—PULVINULINA, *Parker* and *Jones.*

44. *P. Hauerii*, d'Orb. Rare.
45. *P. repanda*, F. and M. Rare.

Genus—ROTALIA, *Lamarck.*

46. *R. Soldanii*, d'Orb. Rare.

The Foraminifera, as determined from the material examined, have been referred to 46 species, belonging to 23 genera, and includes one variety not hitherto described. The Foraminifera as a whole bear a striking resemblance to those found in the Lower Bed of the Muddy Creek section, Victoria (*vide* Trans. Roy. Soc. S. Aus., vol. XII., p. 1), there being no less than 35 species common to the two localities, whilst only 11 are found in the Kent Town material which are unrecorded from Muddy Creek. It is also interesting to note that of the 35 species referred to, 16 are common to both the Upper and Lower Beds of Muddy Creek, whilst the remaining 19 are found in the Lower Bed only. The importance of the last mentioned fact will be understood when it is stated, that whilst 19 species distinctive of the Lower Bed are found in the Kent Town material, not one of the species limited to the Upper Bed of Muddy Creek has been detected in the Kent Town Bore. The palæontological evidence is therefore very definite in leading us to assign a geological age to the marine beds of the Kent Town Bore closely synchronous with those of the Inferior Beds of Muddy Creek, which, as determined by Prof. Tate from the higher organisms, must be low down in the Tertiary series. The remarkable affinities which the foraminiferal fauna exhibit to the Lower as compared with the

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Upper portions of the Muddy Creek Beds gives independent confirmation of the conclusions already reached from their dissimilar fossil contents of a well-marked unconformability existing in the Tertiaries of Western Victoria.

General Microzoa.—The following were observed in course of examination of material, viz. :—Several species of Entomostraca, otolites, small fish bones, and a few straight and rough arenaceous tubes of doubtful affinities.

DESCRIPTION OF PLATE XIII., figs. 11 to 13.

Figs. 11-13. *Truncatulina margaritifera* var. *Adelaidensis*, Howchin.
Fig. 11. Lateral view of superior surface of test. x 36 diam.
Fig. 13. Lateral view of inferior side, showing oral aperture somewhat broken.
Fig. 12. Peripheral aspect, showing the compressed features of the test oral aperture and biconvex outline of the primordial region.

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THE FORAMINIFERA OF THE OLDER TERTIARY, MUDDY CREEK, VICTORIA — ADDENDA ET CORRIGENDA.

By WALTER HOWCHIN, F.G.S.

[Read March 3, 1891.]

Plate XIII., figs. 9, 10.

In the paper published on the above subject (Trans. Roy. Soc., S. Aus., vol. XII., p. 10) it was stated that a very fine example of what was undoubtedly a new species of *Rhabdogonium* had been obtained from the Upper Bed of the Muddy Creek section, but as it was mislaid at the time of publication it could not be described. It has since been found, and I now submit the following description.

FAMILY LAGENIDÆ.

Genus—RHABDOGONIUM, *Reuss.*

Rhabdogonium exsculptum, *sp. nov.* Plate xiii., figs. 9-10.

Test elongate, straight, tapering towards either extremity; triangular in transverse section, exhibiting three very strong longitudinal ridges, separated by deep grooves; ridges blunt, and quadrate on their outer faces. Longitudinal grooves deep, penetrating nearly to the centre of the test. Septal lines flush, straight, and very numerous. Aperture, a circular mouth at end of produced neck. Length, $\frac{1}{10}$ in.

This is a somewhat remarkable form. Its nearest ally is *R. tricarinatum*, d'Orb., but can be readily distinguished from that species by its three conspicuous keels or ridges, which practically compose the whole of the shell, and also by the greater number of its chambers. It is apparently restricted to the Upper Bed of the Muddy Creek (? Miocene) section, in which it is rare.

DESCRIPTION OF PLATE XIII., figs. 5-10.

Figs. 5-8. *Fabularia Howchini*, Schlumberger. For descriptiont see p. 346. of present volume. Upper Bed, Muddy Creek.

Fig. 9. *Rhabdogonium exsculptum*, Howchin. Lateral view, showing deep groove. x 20 diam. Upper Bed, Muddy Creek.

Fig. 10. *Rhabdogonium exsculptum*, Howchin. Transverse section of test.

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By a clerical oversight the following species were omitted from the list of Foraminifera as published *loc. cit.*, p. 16, from the Upper Bed at Muddy Creek :—

Genus—POLYSTOMELLA, *Lamarck.*

181*a*. †*P. striato-punctata*, F. v. M. Rare.
181*b*. †*P. subnodosa*, Münster. Common.
181*c*. †*P. crispa*, Linn. Rather scarce.

Mr. Sherborn, of London, has kindly drawn my attention to the fact that *Orbitoides stellata*, described and figured by me in *loc. cit.*, p. 17, pl. i., figs. 9-11, has been described by d'Archiac in Mém. Soc., Géol., France, ser. 2, vol. XI., plate vii., fig. 1, and, by a curious coincidence, under the same specific name. D'Archiac's specimens were from the Tertiary of Les Corbières. Hantken has also obtained the same form from the Tertiaries of Hungary.

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ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1890-91.

ORDINARY MEETING, NOVEMBER 4, 1890.

WALTER HOWCHIN, F.G.S. (Vice-President), in the chair.

PAPER.—"On the Geological Structure of the Adelaide Plains, with special reference to the Croydon Bore and the so-called Coal Discoveries at Adelaide," by Prof. RALPH TATE, F.G.S., F.L.S., &c., &c.

ORDINARY MEETING, DECEMBER 2, 1890.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

EXHIBITS.—A. ZIETZ, Assistant Director of the S.A. Museum, showed marine specimens taken from the Port Darwin telegraph cable at the site of its fracture, near the coast of Java, namely, a stalked feathered-starfish *(Pentacrinus)*, 2 species of free feathered-starfish *(Comatula)*, 2 large brittle starfish, and a number of *Cirripedia* of deep-sea forms. Also 8 species of crustaceans, of which several are probably new to science.

MOTIONS.—It was moved that a grant of money be made towards defraying the expenses of the proposed Antarctic Expedition. The motion was lost, but at the same time the Council was desired to inform the Committee of the expedition that, whilst fully sympathising with the scientific objects in view, the Society did not feel justified in granting any sum of money, as it had various important claims upon it connected with South Australia. Prof. TATE moved and Prof. RENNIE seconded and it was unanimously carried—"That this meeting learns with deep regret the loss sustained by the Linnean Society of New South Wales and science in general by the death of its President (Prof. W. J. Stephens)." It was moved and carried—"That it be a recommendation to the Council to solicit from Mr. James Parkinson a paper detailing his important geological discoveries in the neighbourhood of Leigh's Creek."

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PAPERS.—"The Cryptogamic Flora of South Australia," by Prof. LUDWIG, Ph.D. "The Grammar and Vocabulary of a Tribe of Natives Inhabiting Central Australia, between the Finke River and Alice Springs," by Rev. H. KEMPE. "Remarks on Plants in South Australia very probably aiding in the Propagation and Perpetuation of the Red Rust *(Puccinea rubigovera)*," by J. G. O. TEPPER, F.L.S. "Description of a New Species of Cossus," by J. G. O. TEPPER, F.L.S.

ORDINARY MEETING, FEBRUARY 3, 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

BALLOT.—Ernest C. Saunders and Edwin Ashby were elected Fellows.

EXHIBITS.—W. HOWCHIN, F.G.S., exhibited an extensive collection of Celts or stone hatchets from Great Britain, Denmark, India, and Australia. Also a carbonaceous shale, of Archæan age, from near the Burra, of a black colour, which, on exposure to heat, turns white and loses 18 per cent. of its weight. J. J. EAST, F.G.S., showed specimens of *serpentine* from the Monarch Mine, near Caroona, Lake Gillies; it was supposed to contain nickel, but the blowpipe test did not reveal that metal. Also a specimen of *emery*, found recently in the Mount Lofty Ranges. J. G. O. TEPPER, F.L.S., exhibited the fruits of *Adamsonia*, from Western Australia, forwarded by his son. Also a specimen of a New Zealand edible fungus *(Hirneola polytricha)*, growing abundantly about Auckland, chiefly on the decaying wood of *Corynocarpus lævigatus* and *Melicytus ramiflorus*, forwarded by Allan Wight, of Pæraa. A. ZIETZ, Assistant-Director of the S.A. Museum, showed a number of native spear-heads, made from various materials, some elaborately carved. D. B. ADAMSON exhibited photographs of the recent solar eclipse.

PAPER.—"Coast Limestones of Fremantle, Western Australia," by Rev. J. G. NICOLAY.

ORDINARY MEETING, MARCH 3, 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

BALLOT.—Walter Gill, F.L.S., Conservator of Forests; W. H. Selway, jun., and Dr. J. Johnson, F.R.C.S. (Eng.), were elected Fellows of the Society.

MOTION.—A communication received from the Hon. Secretary (A. E. McDonald, Esq.) of the Royal Geographical Society of Australasia (Victorian Branch) was read, to the effect that "at a meeting of the Antarctic Committee, February 24, 1891,

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Captain Pascoe, R.N. (President), was deputed to interview the Melbourne delegates to the Sydney Federal Convention. Will you take immediate steps and urge your representatives to give cordial support to the movement?" It was moved and decided to give the movement the hearty and moral support of the Society, and to telegraph to the Premier (Hon. Thomas Playford), requesting him to recommend the matter for the consideration of the Federal Council.

EXHIBITS.—J. G. O. TEPPER, F.L.S., laid on the table two old and rare books—*(a)* "Philosophic Transactions of the Royal Society, London," 1684; *(b)* Swartz's "Observationis Botanicæ," 1791. Also some red earth from Roebuck Bay, Western Australia, eaten by the natives there, not from necessity, but as an article of their diet. Also the fruits of *Citrus australasica*, from Cooper's Creek, and *Capparis Mitchelli*. Also several insects, *e.g.*, a wasp with a spider it had caught, forwarded by Mr. Stacey; a specimen of *Perga affinis* and its larvæ; and a nocturnal moth with its underground cell, in which the pupa was lodged. A. ZIETZ, Assistant-Director of the Museum, exhibited some snakes from Central Australia, forwarded by Rev. H. Kempe (Correspond. Memb.), viz.:—Skin of an enormous poisonous snake, nine feet in length, belonging to the genus *Tropidechys*, sp. nov.; a specimen of the genus *Hoplocephalus*, sp. nov.; and specimens of *Furina Ramsayi* and *Vermicella Bertholdi*. Also, a species of perch from the R. Finke; and a sample of white chalky earth.

PAPERS.—"Description of *Notoryctes typhlops*," by E. L. STIRLING, M.D., F.R.C.S. Eng. "Foraminifera of the Older Tertiaries, Part II. (Kent Town Bore)," by W. HOWCHIN, F.G.S

ORDINARY MEETING, APRIL 7, 1891.

Prof. RALPH TATE (Vice-President) in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., showed specimens of *Postrychus Jesuitica* from Port Pirie district, where it was attacking species of Acacia. Also some rock specimens from the neighbourhood of Lyndoch. J. C. F. JOHNSON, M.P., forwarded specimens of beetles from Western Australia, some of which Mr. Tepper thought were new. A. ZIETZ, Assistant-Director of the S.A. Museum, showed specimens of mollusca inhabiting the open sea, *e.g.*, a species of *Pteropoda*, two species of *Heteropoda*, and one of *Nudibranchiata*. Also species of *Salpa*, *Pyrosoma*, *Porpita*, and *Diphysiopsis*. Of vermes, a species of *Sagitta*. Also a series of larval stages of the higher crustacea. And several species of fish, one being a species

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of *Scopelus*, showing the lateral luminous organs. WALTER HOWCHIN, F.G.S., exhibited some Foraminifera that were rock-builders. One sample, *Orbitoides Mantelli*, was from the Eocene-beds of Victoria. O. B. LOWER forwarded a specimen of the leaf-butterfly from the Khasia Hills, India.

NOTIFICATIONS.—Prof. TATE referred to a recent visit to the glaciated surface at Hallett's Cove with Mr. Robert Jack, Government Geologist for Queensland, who, after examination of the surface, concluded that the ice had travelled northward. A. ZIETZ drew attention to the occurrence of *Perameles Gunnii* (the soft-furred bandicoot) in South Australia. The specimens were obtained by Mr. Scriven, near Border Town. The habitats previously given of the marsupial were Tasmania and Victoria, on the authority of Mr. Oldfield Thomas, of the British Museum. Mr. Zietz referred to an evident misprint in the Catalogue-description, which should read "tail only dark above its base for one inch."

PAPERS.—"Habits and Customs of the Aborigines about the R. Finke, Central Australia," by Rev. Louis Schulze. "Description of New Coleoptera," by Rev. Thomas Blackburn, B.A.

ORDINARY MEETING, MAY 5, 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

MOTION.—It was moved and carried—"That in the opinion of the Society, it is highly expedient that the Director of the Botanic Gardens, Adelaide, should be a botanist of high standing and attainments." It was also decided that the Chief Secretary be interviewed on the subject.

EXHIBITS.—Prof. TATE, F.G.S., showed coloured photographs of glaciers. Also a collection of rare species of *Cypræa* from Eocene strata of South Australia and Victoria. A. ZIETZ, Assistant-Director of the S.A. Museum, exhibited a large collection of weapons, charms, &c., used by the aborigines of Finke River district. CHARLES CHEWINGS, F.R.G.S., showed rock-specimens and fossils from the southern flanks of the MacDonnell Ranges. The fossils were in an excellent state of preservation, and comprised, amongst others, an *Orthoceras*, a *Raphistoma*, one or more species of *Leptæna*, and the tail of a large trilobite (*Phacops*, sp. ?). The facies was that of an Upper Silurian fauna.

PAPER.—An abstract was read from Mr. Schulze's paper submitted at the last meeting.

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ORDINARY MEETING, JUNE 2, 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

VOTE OF THANKS.—J. G. O. Tepper, F.L.S., and W. L. Cleland, M.B. (Hon. Sec.), were thanked for having prepared the abstract of Mr. Schulze's paper read at last meeting.

EXHIBITS.—A. ZIETZ, Assistant-Director S.A. Museum, showed a number of boomerangs, curiously carved, which had been forwarded to the Museum from the Elder Exploring Party. O. W. LOWER forwarded two species of moth, namely *Sphinx roseomaculata* and *S. distincta*.

PAPERS.—"Geological Notes on the Upper Finke River Basin," by CHARLES CHEWINGS. "Descriptions of New Australian Lepidoptera," by E. MEYRICK, M.A.

ORDINARY MEETING, JULY 7, 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

VOTE OF CONDOLENCE.—The PRESIDENT reported the death of D. B. Adamson since last meeting. It was unanimously resolved that a letter of condolence and sympathy be sent to the widow expressing the loss felt by the Society in his death.

EXHIBITS.—A. ZIETZ, Assistant-Director of the S.A. Museum, exhibited the birds collected by Dr. Stirling during his transcontinental trip with Lord Kintore through Central Australia. O. B. LOWER forwarded specimens of *Charaxis Berenice*, or parrot butterfly, from Accra, Gold Coast, Africa.

PAPER.—"Plants collected by Dr. Stirling in Central Australia," by Prof. TATE.

ORDINARY MEETING, AUGUST, 4 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

BALLOT.—A. F. Calvert was elected a Fellow of the Society.

VACANCY IN THE COUNCIL.—W. B. Poole was elected to fill the vacancy in the Council caused by the death of D. B. Adamson.

EXHIBITS.—A. ZIETZ, Assistant-Director of the S.A. Museum, exhibited a collection of turtles and tortoises from the Northern Territory. W. HOWCHIN, F.G.S., referred to the recent find of a *Diprotodon* skull at Gawler, together with other bones. J. J. EAST, F.G.S., showed an obsidian bomb of large size.

PAPERS.—"On a Subterranean Water-supply to Broken Hill," by SAMUEL DIXON; "Analysis of Volcanic Ash from Tanna, New Hebrides," by Prof. RENNIE, D.Sc.

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ORDINARY MEETING, SEPTEMBER 8, 1891.

Rev. THOMAS BLACKBURN, B.A. (President), in the chair.

BALLOT.—R. S. Rogers, M.D., was elected a Fellow of the Society.

AUDITOR.—D. J. Adcock was elected auditor of the current year's accounts.

EXHIBITS.—O. B. LOWER exhibited two foreign butterflies. J. G. O. TEPPER, F.L.S., showed an insect that had been caught in a crack of Miocene clay, which on becoming moist had expanded and thus imprisoned and pressed the insect. Prof. TATE drew attention to how such an object occurring in a fossilised condition might lead to an erroneous conclusion unless carefully observed. In such a case the object would be more or less perpendicular to the deposit instead of being horizontal to it.

VOTE OF CONDOLENCE.—It was decided to send a letter of condolence to the widow of the late L. S. Wilkinson, Government Geologist for New South Wales, on the loss she had sustained, and expressing the regret felt by the Society.

PAPERS.—"New Mollusca," by Professor TATE. "Second Supplement to S.A. Bivalves," by Prof. TATE. "Notes on *Emydura latisternum* occurring in South Australia," by A. ZIETZ. In addition to the previously-known occurrences of *Chelodina longicollis*, in the River Murray and its tributaries, and *Chelymys Macquaria*, in Lake Alexandrina, Mr. A. Zietz records *Emydura latisternum* from the Mount Gambier lakes and the River Torrens, the latter locality from a capture made about 20 years ago, the former more recently. Hitherto the species has been known as inhabiting Queensland only.

ANNUAL MEETING, OCTOBER 6, 1891.

Rev. THOMAS BLACKBURN, B.A., in the chair.

REPORTS.—The annual report and balance-sheet of the Society were read and adopted. The annual reports and balance-sheets of the Field Naturalist and Microscopical Sections were accepted.

ELECTION OF COUNCIL.—The Council for the ensuing year was elected as follows:—President, Rev. Thomas Blackburn, B.A.; Vice-Presidents, Prof. Tate, F.G.S., F.L.S., and Samuel Dixon; Hon. Treasurer, Walter Rutt, C.E.; Hon. Secretary, W. L. Cleland, M.B.; Members of Council, Prof. Rennie, D.Sc., E. C. Stirling, M.D., Walter Howchin, F.G.S., W. B. Poole, Maurice Holtze, F.L.S., and J. S. Lloyd.

VOTE OF THANKS.—It was moved and carried that a special vote of thanks be passed to the following Fellows for their services on

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the Council during the past year, namely, Prof. Tate, as Editor; Walter Rutt, C.E., as Treasurer; and W. L. Cleland, M.B., as Secretary.

PRESIDENT'S ADDRESS.—The President (Rev. THOMAS BLACKBURN, B.A.) then read his presidential address. It was carried unanimously that the address be printed.

PAPERS.—"Coleoptera of Australia," by Rev. THOMAS BLACKBURN, B.A. "Critical Remarks on Described Species of Australian Tertiary Echinoidea," by Prof. TATE, F.G.S., &c., &c. "Further Notes on Habits and Anatomy of *Notoryctes typhlops*," by Dr. Stirling. "Description of a New Foraminifer," by Mons. Schlumberger.

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ANNUAL REPORT.

The Council has the pleasure of reporting that the work of the Society has been carried on successfully during the past year; and congratulates the Fellows and Members upon again meeting in a room entirely devoted to the use of the Society and its Sections, and excellently adapted for that purpose. It may be mentioned that the room was first used by the Society for its annual meeting on August 29th, 1860.

An interesting feature of the exhibits has been the showing of the recent accessions to the Museum collected by Dr. Stirling during his trans-continental trip with His Excellency the Governor, Lord Kintore, full catalogues of which have now been completed by Mr. A. Zietz, the Assistant-Director of the Museum.

During the past year seven Fellows have been elected, and one Corresponding Member transferred to the list of Fellows.

The Council has again the melancholy duty of reporting the death of three of the Fellows of the Society, namely F. S. Crawford, Dr. R. Schomburgk, and D. B. Adamson.

Frazer S. Crawford, who was elected a Fellow in 1865, was known chiefly for his study of the various parasites affecting fruits and cereals, and for his attempts to obtain reliable prophylactics for the same. As his labours assumed, to a very large extent, a practical turn, and were not directed so much to the discovery of new scientific facts of an exact nature as to affording useful information to the cultivators, his contributions to the Transactions of the Society were but scanty, and afforded no index of his untiring industry in his particular line of scientific work. Hence, his reputation as a scientist was more appreciated by Agricultural and Horticultural Societies, and by co-workers in the same field in different parts of the world, with whom he was a valued correspondent, than by this particular Society. His contributions consisted of papers "On the Apricot Disease" and "Notes on Certain Pores on the Veins of some Diptera."

Richard Schomburgk, Ph.D., was elected a Fellow of the Society in 1865, and was for many years an active member. Since 1878, when he read a paper on "Vegetable Fragments found in the tombs and other monumental buildings of the Ancient Egyptians," he has not contributed anything to the published Transactions of the Society. This was probably due to the full occupation of his time by his official duties and his advancing

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years. Here again, unfortunately, the Society did not reap that harvest of scientific work which it might reasonably have expected from the hands of so distinguished a scientist.

D. B. Adamson, elected a Fellow in 1867, was well known to all as being pre-eminently a mechanical genius, and many of the older Fellows will remember his exhibition of various mechanical novelties of his own workmanship. From 1878 he was a constant member of the Council of the Society, and by his punctual and unfailing attendance at the meetings he considerably assisted at the dispatch of the business of the Society. Even in the well-trodden paths of mechanics he succeeded in evoking certain new facts which were considered worthy of being recorded in the Transactions of the Society. His chief contributions were—"Improvements in Curré's Di-electric Machine" and "On Measuring the Power of Telescopic Eye-pieces." He also at different times exhibited photographs of the moon, and of the recent solar eclipse.

Six Fellows have resigned, namely, Hon. A. Campbell, H. P. Gill, S. Knevett, W. J. E. Middleton, C. Unbehaum, and G. Vickery.

Ten Fellows have had their names removed by the Council from the list of members for non-payment of arrears of subscriptions, namely, W. T. Angove, J. E. Brown, F. W. Davis, Thos. Gill, C. H. Harris, Prof. Lamb, E. Laughton, M. P. O'Leary, F. Wheeler, and C. L. Wragge.

The membership of the Society consists at the present time of 10 Hon. Fellows, 88 Fellows, 13 Corresponding Members, and 1 Associate.

The Council is able to report that, owing to the increased shelving accommodation, the books belonging to the Society are now arranged in an easily-accessible position. It would suggest, as a recommendation to the Council for the coming year, that it consider some plan for facilitating the access of the Fellows and Members to the books. As usual, many valuable monographs, and a continuance of the numerous scientific serial publications from all parts of the world, have been received.

In order to make the library of the Society still more comprehensive and complete, the Council has put itself in communication with a number of American and European scientific Societies, whose publications have been solicited in exchange for those of this Society. The names of the principal ones are as follows:—Department of Agriculture, Washington; American Assoc. Advancement of Science, Salem, Massachusetts; N. Y. Microscopical Society, New York; Society Natural Sciences, Buffalo, Indiana; The Entomological Club, Cambridge, Massachusetts; Society Natural History, Cincinatti; and the Zoological Society,

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Philadelphia. The Italian Entomological Society, Florence; the National Museum Natural History, Genoa; the Italian Society Natural History, Milan; the Zoological Station, Naples; and the Natural Science Society, Pisa. The Anthropological Society, Vienna; also the Natural History Museum of the same place. The Royal Museum of Natural History, Brussels. The Asiatic Society of Japan. The Scientific Society, Mexico. The Imperial Society of Naturalists, Moscow; and the Geological Society of the Institute of Mines of St. Petersburg. Also the Minister of Public Instruction, Paris, has been written to; as well as the Entomological Society and Royal Academy, Brussels. From Liege, the Memoirs of the Royal Society of Sciences; and from Leyden, Notes from the Leyden Museum have been received. The list of Australian exchanges has also been further made up, making a total of over 40 new exchanges which your Council hopes in time the Society may receive.

Following its usual custom of acting as your steward, the Council has made grants of money to help in furthering certain local scientific works. The most noteworthy of these were those for collecting palæontological specimens at Curramulka, Y.P., and the MacDonnell Ranges.

The vacancy in the Council caused by the death of Mr. D. B. Adamson was filled by the election of Mr. W. B. Poole, a former member of the Council.

The Fellows will have noticed that Part I. of the current year's Transactions has already been published and issued; and that the artistic work displayed in the illustration of Dr. Stirling's description of *Notoryctes typhlops* is of a very high order, and reflects great credit on the lithographer (Mr. H. Barrett), the Society, and South Australia.

The statement of receipts and expenditure by the Hon. Treasurer (W. Rutt, C.E.) will show that the financial position of the Society continues sound, notwithstanding its heavy expenditure.

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THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£	s.	d.	£	s.	d.
October 1st, 1890.						
To Balance				332	16	8
" Subscriptions—						
Royal Society	108	3	0			
Field Naturalists' Section ...	18	0	0			
Microscopical Section	7	10	0			
				133	13	0
" Government Grant				145	1	0
" Interest				10	19	8
				£622	10	4

Cr.	£	s.	d.	£	s.	d.
By Cost of Transactions—						
Printing and Binding (1½ years)...	153	14	6			
Illustrating, &c.	47	2	6			
Publishing	15	4	7			
				216	1	7
" Wages—Caretaker and Occasional Assistance				4	7	0
" Printing, Postage, Telegrams, and Stationery				12	18	11
" Advertising				8	14	2
" Library—Binding				15	19	0
" Stamp Duty				0	2	6
" Grant in aid of Geological Exploration at Curramulka				3	0	0
" Field Naturalists' Section—Grant				20	0	0
" Microscopical Section—Grant ...				7	10	0
September 30th, 1891.						
By Balance—						
Bank of South Australia	78	14	8			
Savings Bank	255	2	6			
				333	17	2
				£622	10	4

Audited and found correct.
D. J. ADCOCK, Auditor.
October 5th, 1891.

WALTER RUTT, Treasurer.
September 30th, 1891.

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PRESIDENTIAL ADDRESS

To the Royal Society of South Australia, October 6, 1891.

It may be within the recollection of Fellows that when the Royal Society, a year ago, proposed to confer the office of President upon me, I *disclaimed* any *fitness* for it, on the ground that my little knowledge of science is confined to a single item in the great field of research, and that an item which is of special interest to very few of my colleagues; so that during my year of office the chair would be unable to take that part which befits its dignity in the various discussions of scientific matters that would probably come before the Society. I felt this strongly at that time, and I have felt it more strongly still as the time has come on when it is the duty of the President to address his colleagues at the annual meeting. Unfortunately, there is but one branch of science on which I could address you without a certainty of being ridiculous, and that branch of science belonging to Natural History is one that (I regret to know) is the subject of special study with very few of our Fellows.

Under these circumstances—although I have, of course, not thought of addressing you on any subject outside that which alone I have attempted to investigate—I have yet endeavoured to find some point from which to look at my own speciality that may also be a desirable point from which to regard at least *other branches of Natural History*. And, with this in mind, it has seemed to me that it would perhaps be no uninteresting task, nor yet an unprofitable one, to speculate upon the ultimate aim—the *final result* of the science which is called by that name Natural History—and to endeavour to place before our minds the particular contribution towards that result which the present generation of workers is more particularly qualified to render.

Such an inquiry is certainly not *wanting in practical importance*, because it is very clear that investigators who are aiming at a given result, soberly and reasonably regarded as possible for them, are infinitely more likely to render valuable service in the field of science than those who turn their attention here, there, and everywhere, and search, not for a recognised desideratum, but for any discovery that may chance to present itself to their gaze.

In the absolute *infancy* of scientific work such "free lances" are more likely to stumble upon what is valuable than when, at a

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later time, scientific work has so far passed the stage of infancy that some idea can be formed concerning what it is likely to develop into.

Now, if a successful attempt is to be made to express in words the ultimate issue of studies in Natural History, it is clear, I think, that the mind must be prepared to look upon much that at present seems to be a *goal* as merely an initiatory stage. The *conclusions* towards which scientific workers are now struggling will, when they are reached, become mere premises to other conclusions, which perhaps again may have to become premises before Natural History can be strictly entitled to the name "science."

We in this generation are taking some of the earlier steps towards *making* it a science. I should suggest as an expression of what at present seems likely to be the *ultimate aim* of naturalists—the statement that their aim is to find out the reasons of the facts of nature. That is a subject that we know scarcely anything about. We can hardly be said to have discovered the meaning of even one or two of the signs on the hieroglyphic scroll of life which may serve as a beginning—by means of which we might attempt the task of deciphering the rest. For example, it certainly cannot be affirmed that the purpose of all the organs of the body in all animals is satisfactorily ascertained. Such a matter as that must be quite elementary in the enquiry I have spoken of, and ignorance or doubt concerning it must absolutely bar the path to the elucidation of more complex problems.

The imagination can delight itself in a world of infinitely interesting speculation if it enter upon the consideration of what will be some of those more complex problems that our descendants will, sooner or later, no doubt be in a position to approach. Take, for example, the question, "What are the reasons of the geographical distribution of species?" When one ponders the marvels of that distribution—how some one characteristic, perhaps a slight (and what seems to us to-day a *curious, unaccountable*) one, appears, and is persistent, or at least frequent, through a long series of species in a particular locality—as, for example, the tendency (in the Australian *Coleoptera)* to the disappearance of one or both claws of the tarsi; or, again, when one notices how certain types (of which *Stigmodera* is an example in Australia—where there are nearly 300 known species) seem to run riot, both in respect of fecundity and development, while others (apparently no less truly indigenous to the country) remain much less plentiful, and much less prolific in development (of which many examples might be cited—for the sake of an instance I will mention the remarkable *Phytophagous* beetle which Professor Westwood some 40 years ago named *Diphyllocera*, and of which there has only since been found one near ally on the Continent);

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or yet again, if one observe the strange effect of *climate* on *color*, how, in one genus (say *Stigmodera)* by far the most richly-colored (as well as largest) species are found in the cooler latitudes, while the genus seems to decline in every way, becoming rarer, and represented by smaller, less brilliant forms as one approaches the tropics, while in another group (say the *Lamiides)* the case is absolutely reversed; when one takes all these and many other such remarkable facts into account, it is impossible to doubt that there is a *reason* for their being facts written, it may be in *geological*, it may be in *chemical* characters, and its record stored deeply in the bowels of the earth, or floating in the atmosphere, or on the ocean, awaiting the day when science shall be strong enough and wise enough to seize and read that record.

I think it is not passing the limits of what we are justified in asserting, to say that for every variety of structure in every species there is a *reason* (at least *conceivably* discoverable). Such an assertion is not based upon any particular view of the *nature* of species. On the theory of their immutability it may be assumed that the Creator of the various forms of life endowed each form with characters suited to what its needs would be, and therefore resulting (even though only by *anticipation)* from its environment. On any theory of *development* or *natural selection*, each character would, of course, *necessarily* be the *direct resultant* of some feature or features in the environment by means of which its development had been provided for.

If this be accepted as an *axiom*, and it really appears to me that it ought to be so accepted, there opens out a field of operations bewildering in its vastness in which one branch of natural science may be foreseen to throw light upon another, in which the problems and perplexities and difficulties of one class of workers may be solved by another class who are investigating what seems to be a totally disconnected subject, and in which some wide-reaching truth may be brought to light by the observance of some character or phenomenon in some sphere of study that for one reason or other appears among the least likely to be productive of important conclusions.

Thus, it is probable that if the reasons were adequately known of *the prevalence of given generic characters in given localities*, they would throw a flood of light upon *geology ;* and *vice versa* if the geological history (in the widest sense of that expression) of a particular country were known in all its details with absolute accuracy, we should be able to specify without much difficulty the reason why the development of the fauna of that country tended in a given direction.

Indeed, it has always appeared to me one of the strongest of arguments for the truth of the theory of development (which

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might almost as well be called the theory of adaptation) that that theory fits in so well with the geological and climatic changes that we know to have occurred in all parts of the world. An unchangeable fauna in the midst of perpetually changing environment would not seem *likely* on *a priori* grounds to have been the form in which the Creator of the universe would design His work. It would be safe to affirm, I believe, that there is no species on the globe which, on the theory of its having been created in its present form, and incapable of structural modification, could have survived the changes that have taken place on and around the earth's surface.

Here, then, we have what (if not the *ultimate* work of natural science) will at any rate be its work in a very advanced period of its career, the investigation of the *reasons* of the facts of nature.

Interesting—even fascinating—as is the contemplation of the problems we can imagine our successors in the field of science a century hence being in a position to investigate successfully, I have, nevertheless, not brought the matter before you this evening merely as a curious speculation, but rather with the purpose of asking your attention to the importance of that step towards the eventual achievement, which falls to the lot of the scientific workers of the present day.

I think it will hardly be doubted that the special task needing to be accomplished by this generation, and in the present state of knowledge, is that of collecting and recording *facts and data*. I imagine there is scarcely a *possibility* of any more advanced work being more than *guessed* at in the lifetime of any one now working at science. The moment one attempts the more complex problems, one feels instantly the need of that exhaustive collection of the data and records of the facts that we are at present engaged in procuring.

Suppose, for example, the question be propounded, "Why is such and such a genus (say *Stigmodera*) an especially Southern Australian form?" We can *imagine* the reason to be founded on some long past *geological* change; but an apparently essential condition of any certainty on the point would be a very accurate and exhaustive knowledge of the fossils of all Australia —so that either it could be determined whether the present distribution is a continuance of that of former periods, or at least it might be said "there is sound reason to believe that geology can *throw no light* on the distribution of that genus in former ages." Geologists are at present working towards the ability to supply such information.

And again, if any attempt be made to generalise from the facts of geographical distribution, as I have no doubt some of my colleagues have learned by experience, the result is little more

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satisfactory than a quickening of one's realization of how little is known concerning it. There are whole *orders* of animals whose geographical range in Australia has scarcely even *begun* to be worked out. Even in the *Coleoptera*—one of the orders that has received most attention—there are comparatively speaking very few genera of which it would be safe to affirm that it had been definitely *proved by facts* to be principally connected with a southern or a northern latitude in Australia, and so forth.

There are vast tracts of the continent of whose fauna we know very little. And even of those parts which have been *more* carefully investigated, the investigation has been productive of little more than a skimming of the surface (at least, as far as regards *publication*). I am not making mere guesses when I say this, for it can be supported with facts. Let me state a few facts. In respect of the vast order *Hemiptera*, including all its near allies—*Homoptera*, &c.—there is not, and, as far as I can ascertain, there *has not been* a single Australian worker—at any rate, not one who has published any scientific work on the subject. The same thing may be said, I believe, of the *Orthoptera* and *Neuroptera*. *One* Australian is working at the *Diptera*; *one* at the *Hymenoptera*.

I am not overlooking the fact that here and there an isolated note may have been published on some member of one or other of these groups; I believe, indeed, that the late Mr. W. S. Macleay, of Sydney (standing almost alone as an Australian scientific entomologist of the last generation) did publish descriptions of a few members of the orders I have named—or some of them; and possibly one or two others may have just touched the subject. But there is no one who is working at them, and publishing on them in Australia in any systematic fashion. And how little has been accomplished even in those orders which have received more attention than others is realised almost distressingly by those who are working at them, in the enormous proportion of undescribed species that accumulate in any collection—accumulate with rapidity and to an extent that almost leads one to become confused and despairing amid the unwieldy mass of material.

Here, again, let me cite specific proofs of what I say. In the family *Hydrophilidæ* (a family containing some of the largest species in the whole order *Coleoptera*), my own small collection contains more species than the total that had been described from all Australia up to the date when the last edition of the "Catalogue of Australian Coleoptera" was published (some six years ago). Among the *smaller Coleoptera* the case is still more remarkable; in the family *Cissidæ* (which is numerously represented in Australia) four years ago no Australian species whatever had been described; in the *Dermestidæ* 13 species had been

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described up to last year from all Australia; my collection contains 22 species. In the *Lathridiidæ*, the number described up to a couple of years ago was four from all Australia; my collection contains 18; probably some of the larger collections (the Sydney or Macleay Museum, for example) contain 50 or more. Thus you see that even in one of the most admired orders of insects the mere work of describing the Australian species is still in its infancy.

It appears, therefore, that the contribution towards natural science, which it falls to the lot of this generation to make, is an accurate statement of facts, which may serve as reliable data in the future.

And here I will point out that not only are we of the present day little, if at all, qualified to attempt higher work, but also that any hope of the accomplishment even eventually of higher work must depend very much on what is done in this generation to provide the required data for our successors. Every day that passes renders those data more difficult to obtain, and less reliable. And that because the work of the world in many of its operations is disturbing the order of Nature. Commerce, for example, is rendering many other races of animals besides those of man and many plants cosmopolitan.

Here, too, I call your attention to the fact that Australia is probably of all the continents that in which the most important and reliable observations can be made. It has often been referred to as a remarkable phenomenon that whereas in the Old World—where the country is cut up into well-protected enclosures, by mighty ranges of snow-clad mountains, and by rivers that man himself is almost at a loss to bridge—the vast majority of species are of very wide distribution, many extending their habitat even from the islands off the West of Europe to those off the East of Asia; here on this Australian continent of vast and waterless plains, where for hundreds of miles the traveller will meet with nothing that could be called the boundary of a natural district, where, if an observant man could be set down in succession at any intervals along a line of two thousand miles, from near the east coast in N. S. Wales, to near the west coast in the neighborhood of Perth, he could scarcely decide from the superficial features of the country whether he was not all the time within a mile or two of his starting point—where wide distribution of species would seem much more probable than in almost any other region of the world—the precise reverse is the case, and there seems to be no other continent where so *few* species have a wide distribution.

This exceptionally limited distribution of species, where the reverse might reasonably have been expected, has often been

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referred to as very surprising. But, I would ask, is it not very probable that the reason why this distribution is so limited is simply that it is *natural*, or nearly so? In most other extensive regions on the earth's surface it has been the case for thousands of years that commerce has been transporting the productions of each place to far distant points, and it can scarcely be thought likely that many species—at least of plants and the lower animals—could fail to have been at some time in such period transported by accident along with articles of trade, and under circumstances suitable to the establishment of their race. It was not until this process had continued for thousands of years that science entered upon the work of systematically describing and naming the various forms of life.

But in Australia the confusing hand of commerce has been held back from tampering with Nature's order until a time when science was to some extent prepared to enter the field, and (as you will, no doubt, remember) the scientific results of Australian exploration from the time of Capt. Cook onwards have been chronicled in at least a sketchy manner.

The reliance that can be placed on the naturalness of the occurrence of any species in an Australian locality is, however, every day becoming less. If there is to be an exhaustive and accurate record handed down for future use in science of the indigenous distribution of species on any large area of the earth's surface—which looks likely enough to be an essential condition of success in solving the more complex problems of natural science that will come before our successors—it would scarcely be going too far to say that it must be made in Australia; and it is absolutely certain that if it is to be made at all it must be made at once. Not only are plants and animals from other continents being naturalised, but those of one locality in Australia are being planted (and are propagating) in other and distant places. As an example, I may mention that only quite recently I have learned, through the observations of the Victorian Colonial Entomologist, that there has of late begun to be met with in Victoria a *Buprestid*, which I find to be *Stigmodera Brucki*, Thoms., an extremely handsome species indigenous to Western Australia, and which there can hardly be a doubt has been introduced into Victoria in timber from Western Australia.

Every year such occurrences become more and more probable, and they will to an increasing extent disturb the natural distribution of species. It is easy to perceive how in future times, and when natural science is in a very advanced state, the absence of reliable information as to what part of Australia is the real home of numerous species which will then probably be distributed over the whole continent, may most seriously interfere with the solution of many most important problems.

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Much, then, in the possibilities of the future in respect of natural science depends upon the thoroughness and accuracy of the work that is done by the scientific men of the present day. If it is not done by them, the opportunity so far as regards a considerable part of it will have been lost for ever. What we have to aim at is (*a*) to catalogue, with sufficient description of an accurate well-worked-out character, all the species found in Australia; and (*b*) to place on record, with exact precision—the result of personal observation, not mere hearsay—a statement of the locality which each species inhabits, and of its manner of life.

But here I shall ask you to notice that the energetic pursuit of this work has a most important bearing upon *economic* science. It is frequently the case (to take an example illustrative of this remark) that some animal (say an insect) exists side by side with some hostile influence—it may be another animal—which latter appears to be the sole instrument that prevents its multiplying to an extent that would render it most mischievous. An instance of this is afforded by many of the wood-boring *Coleoptera*, which are preyed upon by *Coleoptera* of the carnivorous groups. Now, if the potentially injurious species be by any means introduced into some locality at a distance from its native habitat without its enemy also being introduced, it is very likely that—nature in its new abode being not armed against it—it will become a scourge, and entail the loss of most valuable property. When this occurs there is an outcry at once raised for a *remedy*, and persons not skilled in Natural History usually look towards the idea of using some chemical substance to poison the depredator or to render that on which it preys distasteful to it. But the direction in which the intelligent scientist will look for a remedy will be very different. His first question will be, "Where is the real home of this species?" and he will feel little doubt that the remedy is to be found in something there which has enabled the article needing protection elsewhere to go on existing in that particular locality in spite of the ravages of its destroyer.

It would not be too much to say that there are hundreds of the most local species of insects which are capable, if transported to localities at a distance from their natural home, of becoming *most injurious to vegetation*; and that in almost every such instance the checking of their mischief could be accomplished only by the transportation in addition of something which in their home has been hostile to their development. The next ten or twenty years will probably see an enormous multiplication of insect pests, owing to the increasing facilities for species being accidentally carried out of their natural and controlling environment.

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Thus you observe that what at first sight looks like *barren* scientific investigation—I refer to the work of simply cataloguing and describing species, and recording their habitat, without any direct reference to economic questions—is in reality of the utmost importance. If an insect pest appear (devastating the timber or the foliage of a district), and no one knows whence it comes, the clue to the method of checking its ravages is missing, and the state of affairs is certainly serious. But if the scientist be at once prepared to say, "This is such and such a species, which is indigenous in such and such a locality, where it is not known to be particularly harmful," it at once becomes tolerably *certain* that a little intelligent investigation in the place indicated will suggest the remedy.

Nor can I omit to remark here that the Governments of the Australian colonies would act wisely if they were to accord more substantial aid than they do to the study of Natural History simply as abstract science, for no one can tell the practical value that may eventually attach itself to the record of even the slightest observation. In two of the sister colonies a "colonial entomologist" has been appointed, whose special work is to investigate the means of checking the ravages of insect pests; and that is, of course, a desirable precaution to have taken. But I venture to say that a few persons possessing a fair knowledge of natural science scattered over each colony, and especially in newly-occupied country, and working there at Natural History as such—and without any direct reference to economic questions—I venture to say that a few such workers would be of almost incalculable value in rendering the work of a "colonial entomologist" capable of attaining its purpose. Civilization and agriculture are advancing year by year, and taking possession for man's use of new tracts of country containing—beyond the possibilities that make for wealth and maintenance—multitudes of natural phenomena and forms of life which are so nicely balanced in numbers and power that no one of them is able to become seriously injurious to the others, but many of which might become so elsewhere if man should have the misfortune by any accident to convey them to distant localities. Surely, then, it is of the utmost importance that simultaneously with the advent of commerce and traffic, science should be represented, and should make its census of the local forms and conditions of life; so that if at some future time some form of life, harmless in its natural abode, should make its appearance elsewhere, having there become a scourge to agriculture, or other forms of industry, it may be at once recognised and traced to its home, where its antidote is no doubt to be found.

It is perhaps difficult to make practicable suggestions as to the method in which a Government could actively aid in scientific

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investigation of the general kind which in the issue will prove to be of even greater importance and more "economic" than what is commonly called "economic science." But I may perhaps draw your attention once more to the fact (mentioned in our annual report) of this Society having recently spent from its funds in paying the travelling expenses of an agent, whom it sent to report upon certain local matters of scientific interest at a distance from Adelaide, and I draw your attention to it in order to suggest the question whether the Government might not fairly be asked to facilitate such investigations by permitting the free use of its railways for a specified journey by a specified person, say, under the condition of a certificate from the Council of the Royal Society, that it was sought for the *bona fide* purpose of desirable scientific exploration, which the person in question was competent to make. It certainly seems a short-sighted policy for a scientific Society to be obliged to pay travelling expenses on Government railways out of its scanty funds in order to procure information that on public grounds it is most desirable should be obtained. There can be no doubt that a very great deal of our scientific work is rendered incomplete, and that facts we desire to discover and observations which ought to be made are lost, perhaps irrecoverably, because of the difficulty of procuring reliable information as to the fauna of the remotest parts of the colony, in which difficulty the cost of travelling is one of the most formidable items; and it is not within the means of this Society to provide funds for the purpose on any sufficiently large scale.

I trust you will pardon me for having detained you so long listening to an address on a subject that is more or less outside the special lines of work that most of the Fellows of our Society are pursuing; and I trust, too, that what I have said may prove to have the effect of suggesting to the minds of some of our Fellows who are not actively pursuing any scientific work, that it really is important for natural science to be investigated and pushed on with as speedily as possible; a suggestion which might well induce them to take up the study of some scientific matter that has been as yet neglected on this continent, and so assist the ultimate purpose of our Society even more satisfactorily than they can do by their merely passive interest and pecuniary support.

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For the Year 1890-91.

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Presented by the respective Societies, Editors, and Governments.

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Granville, Ohio—Bulletin Scientific Laboratories, Denison University, vol. V.
Minneapolis—Bulletin of the Minesota Academy of Natural Sciences, 1883-86.
New York—Transactions of the New York Academy of Sciences, vol. IX., Nos. 1 and 2.
———— Annals ditto, vol. V., Nos. 1, 2, and 3.
Philadelphia—Proceedings of the Academy of Natural Sciences, part 3, 1889; part 1, 1890.
———— Wagner Free Institute of Science, vol. III., 1890.
San Francisco—Proceedings of Californian Academy of Sciences, vol. II. (second series), 1889.
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MONOGRAPHS AND BOOKS.

Presented by the respective Societies, Museums, and Governments.

Backhouse, T. W.—Structure of the Sidereal Universe.

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——————— Mollusca Trawled off Mirembula, N.S.W.

Brown, H. Y. L., Government Geologist, S.A.—Report of Country, Alice Springs.

French, C., F.L.S.—Handbook Destructive Insects, Victoria.

Hayter, H. H., C.M.G., Government Statist, Victoria—Victorian Year Book, vols. I., II., 1889-90.

——————— Census, Victoria, Approximate Return, 1891.

Helland, Amund—Lakis Kratere og Lavastromme.

Kirk, T. W., F.L.S.—Icerya Purchasi, and its Cure.

——————— Notes on the Breeding Habits of the European Sparrow *(Passer domesticus)* in New Zealand.

——————— Phylloxera and other Diseases of the Vine.

Leibius, A., Ph.D., M.A.—Presidential Address Royal Society, N.S.W.

Marçou, Jules—Lower and Middle Taconic of Europe and North America (Cambridge, U.S.A.).

——————— Pamphlets (2).

Mueller, Baron F. von—Iconography Australian Salsolaceous Plants, decades I. to VII.

North, A. J.—Supplementary Catalogue Nests and Eggs, Australian and Tasmanian.

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Rand, Rev. Silas T., D.D., LL.D.—Dictionary Language Micmac Indians, Halifax, Nova Scotia.

Stirling, Jas., F.G.S., F.L.S.—Notes on the Hydrology of the Mitta Mitta, Melbourne.

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LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1891.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election.

HONORARY FELLOWS.

1857. BARKELY, SIR HENRY, K.C.M.G., K.C.B., F.R.S., Royal Colonial Institute, London.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Government Astronomer, Victoria, The Observatory, Melbourne, Victoria.
1890. *ETHERIDGE, ROBERT, Palæontologist to the Geological Survey of New South Wales, Sydney.
1853. GARRAN, A., LL.D., Sydney, New South Wales.
1855. HULL, H. M., Hobart, Tasmania.
1878. JERVOIS, SIR W. F. D., K.C.M.G., C.B., F.R.S., Ex-Governor of South Australia, London, England.
1855. LITTLE, E.
1878. MACLEAY, SIR WILLIAM JOHN, F.L.S., Ex-President Linn. Soc. N.S.W., Sydney, New South Wales.
1879. *MUELLER, BARON F. VON, K.C.M.G., F.R.S., M. and Ph.D., F.G.S., F.R.G.S., F.C.S., C.M.Z.S., &c., &c., Government Botanist, Melbourne, Victoria.
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer N.S.W., Sydney, New South Wales.

CORRESPONDING MEMBERS.

1881. BAILEY, F.M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1880. CANHAM, J., Stuart's Creek, Beltana, South Australia.
1881. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
1888. *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Glenferrie, Melbourne, Victoria.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, Northern Territory, Australia.
1881. GOLDSTEIN, J. R. Y., Melbourne, Victoria.
1878. *HAYTER, H. H., M.A., C.M.G., F.S.S., Government Statist, Melbourne, Victoria.
1880. *KEMPE, REV. J., Hermannsburg, Charlotte Waters, South Australia.

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1889. *MacGillivray, P. H., M.R.C.S., F.L.S., Bendigo, Victoria.
1888. *Maskell, W. M., Wellington, New Zealand.
1886. Nicolay, Rev. C. G., Fremantle, Western Australia.
1880. *Richards, Mrs. A., Beltana, South Australia.
1883. *Stirling, James, F.L.S., Assistant Geological Surveyor, Elsternwick, Victoria.

FELLOWS.

1887. Adcock, D. J., Adelaide, S A.
1874. Angas, Hon. J. H., M.L.C., Adelaide, S.A.
1891. Ashby, Edwin, North Adelaide, S.A.
1887. Bagot, John, Adelaide, S.A.
1887. *Blackburn, Rev. Thomas, B.A., Woodville, South Australia.
1890. Board, Gregory, Metallurgist Port Pirie Smelting Works, Port Pirie, S.A.
1884. Boettger, Otto, Adelaide, S.A.
1886. Bragg, W. H., M.A., Professor of Mathematics University of Adelaide, S.A.
1882. Brown, L. G., Adelaide, S.A.
1883. *Brown, H. Y. L., F.G.S., Government Geologist South Australia, Adelaide.
1884. Bussell, J. W., F.R.M.S., North Adelaide, S.A.
1891. Calvert, A. F., Adelaide, S.A.
1888. Chapman, R. W., M.A., B.C.E., Lecturer on Mathematics and Physics University of Adelaide, S.A.
1879. *Cleland, W. L., M.B., Ch.M., F.R.M.S., J.P., Assistant Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer on Materia Medica University of Adelaide, Parkside, S.A.
1876. (L) Cooke, E., Commissioner of Audit South Australia, Adelaide.
1880. Cox, W. C., Semaphore, S.A.
1887. *Dixon, Samuel, Adelaide, S.A.
1876. Dobbie, A. W., Adelaide, S.A.
1890. *East, J. J., F.G.S., Registrar School of Mines, Adelaide, S.A. (Corresponding Member, 1884).
1871. Elder, Sir Thomas, K.C.M.G., Adelaide, S.A.
1887. Eyres, Thomas, Adelaide, S.A.
1886. Fleming, David, Adelaide, S.A.
1890. Fletcher, Alfred W., B.Sc., Kent Town, S.A.
1876. Fletcher, Rev. W. Roby, M.A., Kent Town, S.A.
1883. Foote, Henry, Burnside, S.A.
1882. Fowler, William, Kulpara, S.A.
1889. Fraser, J. C., Adelaide, S.A.
1882. Gardner, William, M.D., Ch.M., Lecturer on the Principles and Practice of Surgery and on Clinical Surgery University of Adelaide, Hon. Surgeon to the Adelaide Hospital, S.A.
1891. Gill, Walter, F.L.S., Conservator of Forests South Australia, Adelaide
1880. *Goyder, George, Jun., Government Analyst South Australia, Adelaide.
1890. Gray, Rev. William, Tanna, New Hebrides.
1887. Grasby, W. C., Editor *Garden and Field*, Adelaide, S.A.
1876. Harrold, A. L., Adelaide, S.A.
1861. Hay, Alexander, Adelaide, S.A.
1882. Henry, Alexander, M.D., Adelaide, S.A.
1891. Holtze, Maurice, F.L.S., Director Botanic Gardens, Adelaide (Corresponding Member, 1882), Adelaide, S.A.
1883. *Howchin, Walter, F.G.S., Goodwood, S.A.

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1883. HUGHES, H. WHITE, Booyoolie, S.A.
1891. JOHNSON, J., M.D., F.R.C.S., Medical Officer Mount Gambier Hospital, Assistant Colonial Surgeon, Mount Gambier, S.A.
1853. (F) KAY, ROBERT, General Director and Secretary S.A. Public Library, Museum, &c., Adelaide, S.A.
1884. LENDON, A. A., M.D., M.R.C.S., Lecturer on Forensic Medicine and on Clinical Medicine University of Adelaide, Hon. Physician Adelaide Hospital and Children's Hospital, North Adelaide, Adelaide, S.A.
1856. LLOYD, J. S., Adelaide, S.A.
1889. LOUGHHEAD, JAS. H., Adelaide, S.A.
1888. LOWER, O. B., Parkside, Unley, S.A.
1885. *LUCAS, R. B., Adelaide, S.A.
1873. MAGAREY, A. T., Adelaide, S.A.
1874. *MAGAREY, HON. S. J., M.D., M.L.C., Adelaide, S.A.
1853. MAYO, GEORGE, F.R.C.S., Adelaide, S.A.
1874. MAYO, G. G., C.E., Adelaide, S.A.
1882. *MEYRICK, E. T., B.A., Ramsbury, Hungerford, Wilts, England.
1880. MOLINEUX, A., Secretary Central Agricultural Bureau South Australia, Kent Town, S.A.
1859. (L) MURRAY, DAVID, Adelaide, S.A.
1884. MUNTON, H. S., Brighton, S.A.
1883. PHILLIPS, W. H., Adelaide, S.A.
1886. POOLE, W. B., Adelaide, S.A.
1882. ROBERTSON, R., F.F.P.S., Adelaide, S.A.
1885. *RENNIE, H. E., M.A., D.Sc., F.C.S., Professor of Chemistry University of Adelaide.
1885. RENNER, F. E., M.D., Petersburg, S.A.
1891. ROGERS, R. S., M.D., Adelaide, S.A.
1879. RUSSELL, WILLIAM, Port Adelaide, S.A.
1876. *RUTT, WALTER, C.E., Adelaide, S.A.
1866. SALOM, M., Adelaide, S.A.
1891. SAUNDERS, ERNEST C., Glenelg, S.A.
1891. SELWAY, W. H., JUN., Adelaide, S.A.
1886. SCOTT, JAMES L., Hyde Park, S.A.
1857. SMEATON, THOMAS D., Blakiston, Little Hampton, S.A.
1871. SMITH, ROBERT BARR, Adelaide, S.A.
1882. SMYTHE, J. T., B.A., B.E., Inspector of Schools South Australia, Glenelg, S.A.
1881. *STIRLING, EDWARD C., M.A., M.D., F.R.C.S., Lecturer on Physiology University of Adelaide, Hon. Director S.A. Museum, Hon. Surgeon Adelaide Hospital, Adelaide, S.A.
1878. STUCKEY, J. J., M.A., Adelaide, S.A.
1876. *TATE, RALPH, F.L.S., F.G.S., Professor of Natural Science University of Adelaide.
1877. *THOMAS, J. D., M.D., F.R.C.S., Adelaide, S.A.
1886. *TEPPER, J. G. O., F.L.S., Entomologist S.A. Museum (Corresponding Member, 1878), Adelaide, S.A.
1856. *TODD, CHARLES, C.M.G., M.A., F.R.S., F.R.A.S. Government Astronomer, Postmaster-General, and Superintendent of Telegraphs South Australia, Adelaide, S.A.
1882. TYAS, J. W., Registrar University of Adelaide, S.A.
1889. VARDON, JOSEPH, J.P., Adelaide, S.A.
1878. *VERCO, JOSEPH C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics and on Clinical Medicine University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, S.A.
1883. WAINWRIGHT, E. H., B.Sc., St. Peter's College, S.A.

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1878. WARE, W. L., Adelaide, S.A.
1879. WAY, EDWARD W., M.B., M.R.C.S., Lecturer on Obstetrics and Diseases Peculiar to Women and Children University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, S.A.
1859. WAY, SAMUEL J., Chief Justice and Lieutenant-Governor South Australia, Adelaide, S.A.
1882. *WHITTELL, HORATIO, M.D., M.R.C.S., F.R.M.S., President Central Board of Health and City Coroner Adelaide, Adelaide, S.A.
1886. WILSON, JOHN, F.E.T.S., Goodwood, S.A.
1886. *ZIETZ, A., Assistant Director S.A. Museum, Adelaide, S.A.

ASSOCIATE.

1884. HODGSON, MRS., North Adelaide, S.A.

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APPENDICES.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT.

The Committee have pleasure in submitting their eighth Annual Report, being for the year ending 30th September, 1891.

Evening Meetings.—Nine evening meetings have been held during the year, at which ten papers have been read. The average attendance again shows an improvement on that of the previous year. The largest number present at an ordinary meeting was 40, whilst at the annual conversazione in October last, about 120 persons attended. With each year of the Section's growth the difficulty increases of obtaining papers without falling back on the same contributors, owing to the limited number of those able or willing to assist in this direction. We have been fortunate, however, in the year under review in obtaining papers on a great variety of subjects, some of which have been contributed by gentleman not members of the Section, whose lectures have proved unusually interesting and instructive, and whose help has been greatly appreciated. The following gentlemen have given either lectures or papers during the year, viz., Professor E. H. Rennie, D.Sc., Rev. T. Blackburn, B.A., Messrs. W. C. Grasby, D. B. Adamson, J. G. O. Tepper, F.L.S., S. Dixon, F. C. Earp, Ph.D., F.C.S., and J. G. McDougall (corresponding member). Your Committee were pleased to receive a paper from a corresponding member, and hope that others will in this way give the Section the benefit of their local observations, as much valuable information may be gained by this means. The subjects of the papers read during the year may be classified as follows:—Astronomy, 1; chemistry, 2; geology and mineralogy 1; botany, 1; zoology, 1; and general subjects (tourists' observations, &c.), 4. The exhibits have, as usual, formed an interesting feature at these meetings. For many of the specimens the Section is indebted to our corresponding members, from whom it is hoped that a still larger number of contributions will be re-

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ceived during the coming year. The conversazione was generally regarded as the most successful gathering of this kind yet held in connection with the Section. The attendance was very large; the exhibits were of unusual excellence; and the whole arrangements gave the greatest satisfaction.

Excursions.—There have been six excursions during the year, at which the attendance has been fairly maintained. Whilst enjoyable as a means of recreation, these outings afford an opportunity of gaining much valuable information of a practical kind, and your Committee trust that these facilities will be more largely utilised by the members. Notwithstanding the difficulty that now exists of finding fresh localities suitable for these outdoor gatherings, almost all the places to which excursions have been held this year have been visited for the first time by the Section. The most successful excursion, from a botanical point of view, was that to Teatree Gully on September 1st, when a rich sandy scrub was met with, containing many plants not usually seen near Adelaide.

Protection of our Native Fauna and Flora.—A separate report from the Committee appointed for this purpose will explain what progress has been made during the past year in connection with this important department of the Section's work.

Publications.—During the year an exchange of publications has been arranged with the Australian Museum, Sydney, from which institution some valuable "Records," &c., have been received. The "Victorian Naturalist" (the journal of the Field Naturalists' Club of Victoria) continues to be regularly supplied to the Section.

Membership.—During the year 13 persons were elected as members of the Section, and 18 names have been removed on account of resignation and other causes. The number now on the roll is 103.

SAML. DIXON, Chairman.
W. H. SELWAY, Jun., Hon. Sec.

Adelaide, 21st September 1891.

THIRD ANNUAL PROGRESS REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE.

In presenting their Third Annual Progress Report, the Committee, although regretting that the advance made has been somewhat tardy, are yet glad to be able to point to certain facts which should give satisfaction.

National Parks.—Owing to the difficulty experienced in getting the Government to take action, the Town Clerk of Adelaide (Mr.

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T. Worsnop), at the instance of the City Corporation, acting in concert with the Committee, prepared a Bill last year vesting the whole of Government Farm in trustees in perpetuity as a National Park. The measure was entrusted to the charge of the Hon. S. Tomkinson, but was not introduced owing to a technical objection raised by the President. The Committee have, however, at last succeeded in gaining from the Premier (Hon. T. Playford) a promise that a Bill with similar objects will be introduced by the Government during the present session. The board of trustees suggested by the Committee includes one representative each of the Royal Society, the University, and the Municipal Association, the Mayor of Adelaide, the Chairman of the Botanic Board, and the Conservator of Forests *ex-officio*, and a Government nominee —a total of seven members.

Forest Reserves.—Last session, on the motion of the Hon. F. Krichauff, the Upper House decided that all forfeited lands in the Hundred of Para Wirra east of the main road from Mount Crawford to Gumeracha should be declared a forest reserve. In answer to an enquiry made by the Committee this year, the Commissioner of Crown Lands (Hon. W. Copley) has stated that these lands are reserved for the protection of the indigenous fauna and flora. Last year the Council also instructed the Surveyor-General to prepare a report as to other suitable sites for forest reserves.

Game Laws.—At the next meeting of the Australasian Association for the Advancement of Science, an attempt will be made to secure concerted action in the different provinces with respect to the amendment of the Game Laws. As in previous years, placards notifying the provisions of the Game Act have been distributed throughout the province by direction of the Commissioner of Crown Lands. The Committee desire to thank Mr. Copley for the special attention which he has given to this matter, and to express their pleasure at noticing certain prosecutions under the Act. On the motion of Mr. Hancock, the Lower House has affirmed the desirableness of declaring a close season for the kangaroo, and the Government have promised to introduce a Bill dealing with the question. The Committee believe that there is a probability of the subject being discussed more reasonably now than it was two years ago.

In conclusion, the Committee can only again express the hope that all friends of the movement will aid them in gaining the desired end.

SAML. DIXON, Chairman.
A. F. ROBIN, Hon. Sec.

Adelaide, September 21, 1891.

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FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

RECEIPTS AND EXPENDITURE FOR THE YEAR 1890-91.

DR. RECEIPTS.	£	s.	d.
To Balance brought forward	5	1	10
" Grant from Royal Society	20	0	0
" Subscriptions	18	0	0
	£43	1	10

CR. EXPENDITURE.	£	s.	d.
By Printing (General)	3	19	0
" Printing (Proceedings)	4	15	0
" Postages	5	13	0
" Advertising	3	3	11
" Attendance	1	4	0
" Sundries	2	2	10
	20	17	9
" Subscriptions, as per contra, handed over to Hon. Sec. Royal Society	18	0	0
" Balance in Hand	4	4	1
	£43	1	10

Audited and found correct,

J. H. C. LANGDON,
THOS. EVANS, } Auditors.

W. H. SELWAY, JUN., Hon. Sec.

Adelaide, 21st September, 1891.

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MICROSCOPICAL SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT, 1890-91.

The Committee, in submitting the Sixth Annual Report, are glad to be able to state that though the number of members is less than at any previous period, there is no lack of interest on the part of those who are really workers with the microscope, and the Section may now be considered as having stood the test of time, and is likely to be still the rallying point for all those engaged in this branch of scientific investigation.

The attendance during part of the session was not as good as it should have been from several causes, but with the return of our Chairman from England greater interest was manifested, and the number of members present at the meetings was considerably increased.

We regret to have to report the death of one of our Vice-Chairmen, Mr. F. S. Crawford, which was a great loss, not only to the Section, but to the colony as a whole. We are pleased that one whose scientific acquirements in his own special department were known beyond the limits of South Australia, was identified so closely with the Section from its formation.

Our Chairman, Mr. Poole, during his visit to Europe, took great pains in acquiring all the information he possibly could on microscopical matters, and we are glad to find that he was everywhere received with great kindness by fellow-workers with the microscope, and we trust that the experience gained by him will be of great service to us.

During the year the following donations of books have been made to the Section :—

A Synonymic Catalogue of the recent Marine Bryozoa, by Miss Jelly ; presented by Dr. H. T. Whittell.
3 vols. American Journal of Microscopy, bound, for 1877-9.
1 vol. ditto ditto, unbound, for 1881.

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The total number of bound volumes in the library is 98, making a valuable collection of works of reference.

We have purchased during the year a good 1½-in. objective for use with the microscope belonging to the Section, and hope shortly to be able to add some higher powers.

We regret that no excursions have been made during the past session, the dryness of the season giving little promise of much success in the way of obtaining pond-life. We hope, however, that we shall be able to commmence again these pleasant and helpful means of increasing our knowledge of the objects of the unseen world around us.

The present number of members is 25 ordinary and 4 honorary. One member only has been elected during the year.

The business and subjects discussed at the meetings were as follows :—

1890.

Oct. 13. "The Foraminifera of the Port River," by Mr. W Howchin, F.R.G.S.

Nov. 11. Exhibition of Lantern Slides of Microscopical Objects, with Optical Lantern, by the Secretary (J. W. Bussell).

1891.

Mar. 10. Gossip Meeting.

April14. Exhibition of various Objects of Interest.

May 12. Address by Chairman (Mr. W. B. Poole) on "Microscopical Matters of Interest."

June 9. Exhibition of Lantern Slides of Photo-micrographs, by Optical Lantern, by the Secretary (J. W. Bussell).

July 12. Demonstration on the Best Method of Illuminating by Central Light, by Chairman (Mr. W. B. Poole).

Aug. 11. Continuation of above.

The balance-sheet shows a balance in hand of £3 12s. 5d., after paying all accounts.

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MICROSCOPICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

RECEIPTS AND EXPENDITURE FOR YEAR ENDING 30TH SEPTEMBER, 1891.

1890.	RECEIPTS.	£	s.	d.
Sept. 30.	Balance in Hand	4	8	7
	Subscriptions	7	10	0
		11	18	7
	Royal Society	7	10	0
		£19	8	7

PAYMENTS.	£	s.	d.
Magazines	0	13	0
Binding Magazines	1	10	0
Printing Annual Report	1	5	0
Post Cards and Printing same	1	8	0
Postage	0	9	2
Caretaker	1	6	0
1¼-in. Objective	1	15	0
	8	6	2
Royal Society Subscriptions	7	10	0
Balance in Hand	3	12	5
	£19	8	7

Audited and found correct,

C. C. PRESGRAVE, Auditor.

W. B. POOLE, Chairman.

J. W. BUSSELL, Hon. Secretary and Treasurer.

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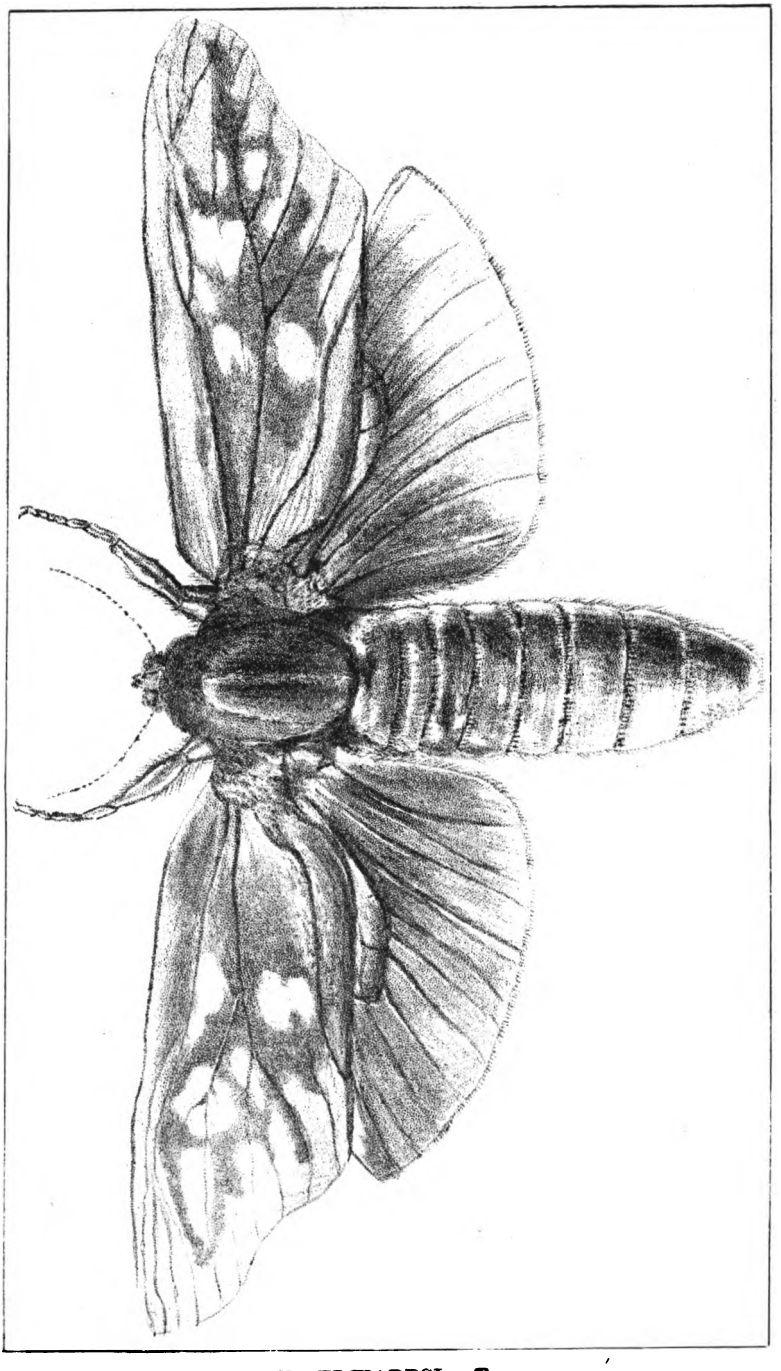
Plate I.



COSSUS EDWARDSI.—*Tepper.*

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EXPLANATION OF PLATE II.

FIGURES.

1. *Notoryctes typhlops.* Side view *(nat. size).* The small orifice at the posterior part of the head is the meatus auditorius externus, from which the fur has been brushed aside for better representation.

2. Foreshortened view of the snout and mouth. The line *a* points to the nostrils and *b* to the mouth.

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EXPLANATION OF PLATE III.

Notoryctes typhlops. Ventral view *(nat. size)*.

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EXPLANATION OF PLATE IV.

FIGURES.

1. *Notoryctes typhlops.* Right manus, external aspect (x 2).

2. " " " " internal aspect as seen from a little in front (x 2).

3. " " " " external aspect as seen from a little behind (x 2).

Letter-references to figs. 1, 2, and 3 :—

a, claw of pollex.
b, " second digit.
c, " third "
d, " fourth "
e, short broad nail of fifth digit.

4. Right pes, plantar (posterior) aspect (x 2).

5. " " dorsal (anterior) aspect (x 2).

Letter-references to figs. 4 and 5 :—

a, claw of hallux.
b, " second digit.
c, " third "
d, " fourth "
e, short broad nail of fifth digit.

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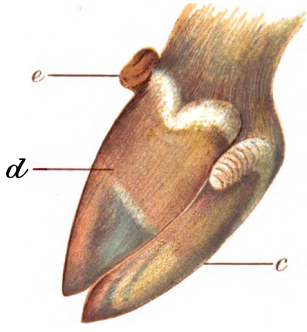

1.(x 2)

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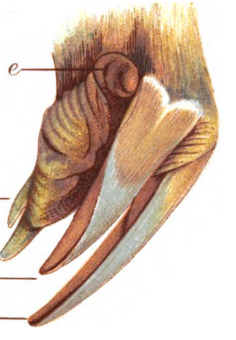

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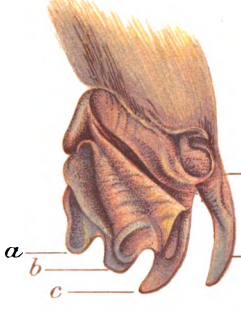

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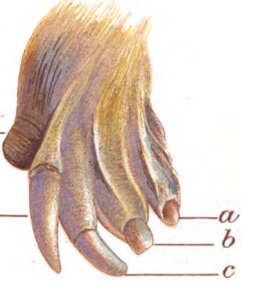

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EXPLANATION OF PLATE V.

FIGURES.

1. *Notoryctes typhlops.* Skeleton (*nat. size*). For convenience the appendages of one side only are represented.

   e, first rib.
   f, keel of presternum.
   l, spinous process of eighth vertebra.
   m.s.s., mesoscapular segment of scapula.
   p, patella.

   The dotted line running along the spine marks the extent of the nuchal muscles.

2. Axial skeleton (*nat. size*).

   a, atlas.
   ac, acetabulum.
   c, fused cervical vertebræ (II.—VI.).
   e, first rib.
   f, presternum.
   t, transverse processes of lumbar vertebræ.
   s.p, symphysis pubis.
   y, chevron bones of caudal vertebræ.

3. Ventral view of posterior part of abdomen of first specimen received, showing indication of pouch *m*.

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EXPLANATION OF PLATE VI.

FIGURES.

1. *Notoryctes typhlops.* Lateral view of skull.
   - *a*, triple ridge on vertex for attachment of nuchal muscles (x 2).
   - *al*, alisphenoid.
   - *eo*, exoccipital.
   - *m*, mastoid.
   - *oc*, occipital condyle.
   - *ty*, tympanic.

2. Foreshortened view of lower jaw (x 2).
   - *c*, condyle.
   - *n*, angle.

3. First maxillary molar, internal view.

4. " " " external view.

5. " " " view from in front and a little below.

6. " " " plan.
   (x 6).
   - *alv*, alveolar border
   - *p*, level of palate

   The remaining letter-references to plates 3, 4, 5, and 6 are sufficiently explained in the text. Similar letters refer to corresponding parts.

7. Second mandibular molar, internal view.

8. " " " external view.

9. " " " plan.

10. " " " view from in front and a little inside.
    (x 6).

    The letter-references are sufficiently explained in the text.

11. Lateral view of the teeth, showing the relation of the maxillary and mandibular series (x 4).
    - *c*, the lower canine. Immediately behind this, the tooth, described in the text as the first mandibular premolar, is missing in the specimen from which the drawing was made.

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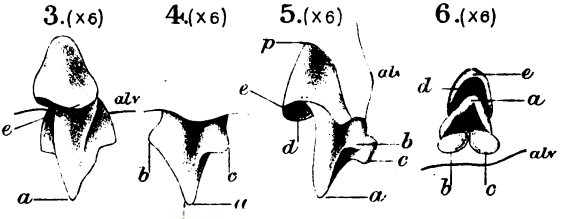

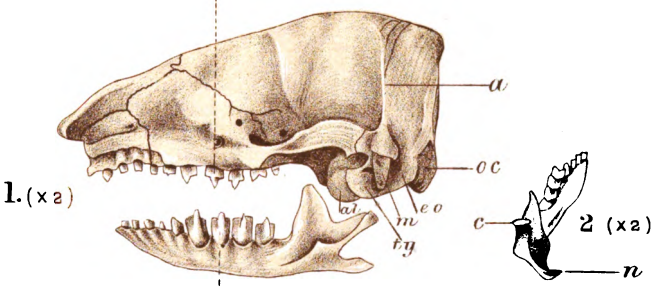

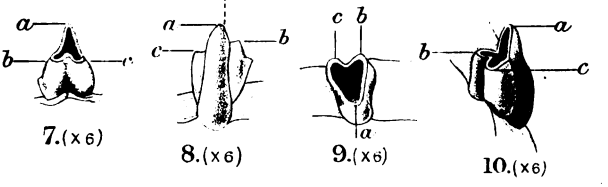

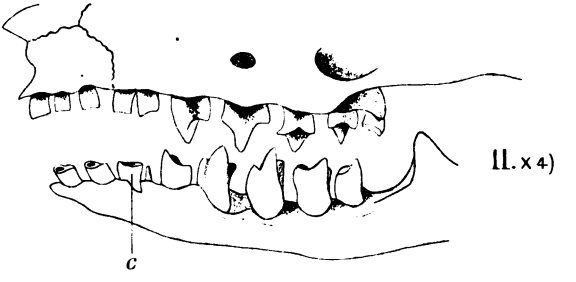

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EXPLANATION OF PLATE VII.

FIGURES.

1. *Notoryctes typhlops.* The skull, dorsal view *(nat. size)*.
   a, the triple ridge on vertex for the attachment of nuchal muscles.
2. Base of skull (x 2).
   al, alisphenoid.
   eo, exoccipital.
   gf, glenoid fossa.
   m, mastoid portion of periotic
   oc, occipital condyles.
   ty, tympanic.
3. Hyoid bone (x 2).
   bh, basihyoid.
   th, thyrohyoid.
4. The same from an older specimen (x 2).
   c, thyroid cartilage of larynx.
   Other references the same as in fig. 3.
5. Ventral view of cervical vertebræ and presternum (x 2).
   a, atlas.
   b, odontoid process of axis.
   c, fused cervical vertebræ, II.—VI.
   d, body of seventh cervical vertebræ.
   e, first rib.
   f, presternum.
   g, second rib.
   h, sternal segment of second rib.
   i, second segment of mesosternum.
6. Lateral view of a portion of the anterior part of the axial skeleton (x 2).
   b, odontoid process of axis.
   c, fused cervical vertebra—II.—VI.
   d, neural arch of seventh vertebra.
   e, first rib.
   f, keel of presternum.
   g, second vertebral rib.
   h, sternal rib of above.
   i, mesosternum.
   k, xiphisternum.
   xxxx, cartilaginous segments of fourth, fifth, sixth, and seventh sternal ribs.
7. Xiphisternum, ventral view (x 2).
   k, marks the junction of the bony xiphisternum with its cartilaginous expansion.
8. View of anterior orifice of thorax (x 2).
   d, neural arch of seventh vertebra.
   e, first rib.
   f, presternum.
   l, spinous process of eighth vertebra.
   m, transverse process of seventh vertebra.
   n, articular surfaces of first rib for the laterally expanded body of the sixth cervical vertebra.
   o, articulation of first rib with presternum.
9. Second lumbar vertebra, anterior view (x 2).
   a, spinous process.
   b, metapophysis.
   c, transverse process.
   d, hypopophyses.
   z, anterior zygapophysis.

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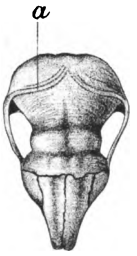

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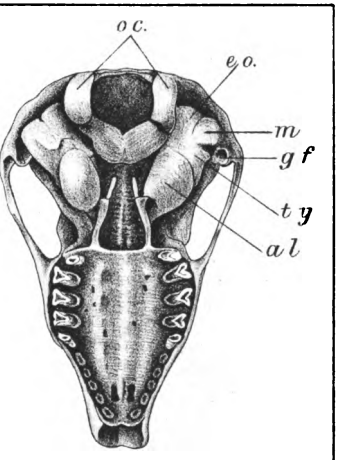

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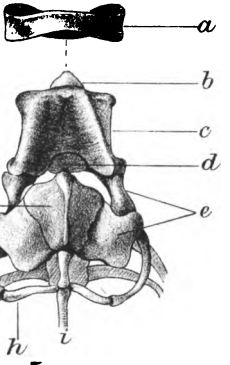

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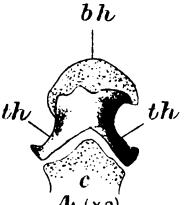

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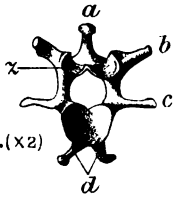

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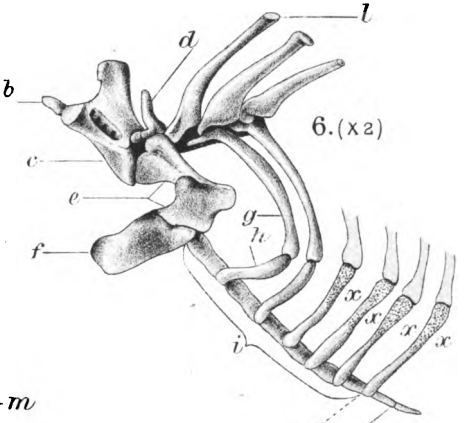

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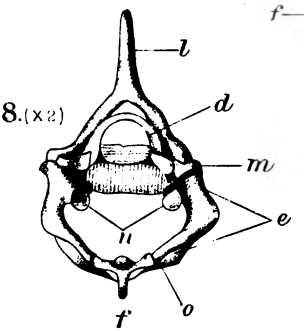

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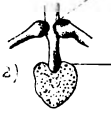

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EXPLANATION OF PLATE VIII.

FIGURES.

1. *Notoryctes typhlops.* Left scapula (x 2).
   - *a*, acromion.
   - *cb*, coracoid border.
   - *cl*, clavicle.
   - *g*, glenoid fossa.
   - *gb*, glenoid border.
   - *m.s.s*, mesoscapular segment.
   - *p*, *vide* text.
   - *s*, mesoscapular spine.
   - *ss*, second spine.

1a, 1b. Transverse sections through the scapula at points indicated by the corresponding dotted lines (x 2). For letter-references see fig. 1.

2. Left humerus, postero-external view (x 2). For letter-references see fig. 3.

3. Left humerus, antero-internal aspect (x 2).
   - *dr*, deltoid ridge.
   - *e.ep*, external epicondyle.
   - *gt*, great or external tuberosity.
   - *h*, head.
   - *i.ep*, internal epicondyle.
   - *lt*, small or internal tuberosity.
   - *r*, articular surface for radius.
   - *u*, articular surface for ulna.

3a. End view of upper extremity of humerus (x 2). For letter-references see fig. 3.

3b. Superior view of parts about the left shoulder-joint *in situ*, with the ligaments left attached (x 2).
   - *a*, acromion.
   - *c*, coracoid process.
   - *cl*, clavicle.
   - *g.t*, external or great tuberosity.
   - *h*, head of humerus.
   - *hm*, shaft of humerus.
   - *l.t*, internal or small tuberosity.
   - *m.s.s*, mesoscapular segment.

4. Left radius and ulna. Postero-external aspect (x 2).
   - *h*, sigmoid notch for humerus.
   - *o*, olecranon.
   - *r*, radius.
   - *u*, ulna.

5. Left manus and forearm, internal or palmar aspect (x $2\frac{1}{2}$).
   - *a*, claw of 1st digit.
   - *b*, " 2nd "
   - *c*, " 3rd "
   - *d*, " 4th "
   - *e*, " short nail of 5th digit.
   - *cu*, cuneiform.
   - *h*, sigmoid notch for the humerus.
   - *p*, pisiform. To this bone belongs the articular surface marked *x* nearest to *p*.
   - *r*, metacarpal common to the first and second digits.
   - *rad*, radius.
   - *sc*, the scapho-carpal of the text.
   - *s* and *s*, metacarpal of third digit.
   - *t*, " fourth "
   - *u*, " fifth "
   - *ul*, ulna.

(For continuation of Explanation of Plate VIII. see back).

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FIGURES.

x.x.x, mark the superior articulation surfaces for the palmar sesamoid bone.

y.y, (placed towards the bases of the large third and fourth claws) indicate the inferior articular surfaces for the palmar sesamoid bone.

The arrow passes through the foramen of the scapho-carpal.

5a. Palmar sesamoid bone, palmar aspect (x 2½).

x.x.x and *y.y*, indicate the position of its articular surfaces on the side away from the observer, which correspond with the surfaces of the preceding figure similarly marked.

6. Left femur, anterior aspect (x 2).

g.t, great trochanter.

l.t, lesser trochanter.

7. Left tibia, fibula and patella, external aspect (x 2).

a, points to the surface of the patella, with which it articulates with the femur. The edge of the surface only is shown.

f, fibula.

o, foramen through head of fibula. Just beneath this, on the side opposite to that shown in the figure, is the articular surface, which is partly for the superior tibio-fibular articulation, and partly for the femur.

p, patella.

t, tibia.

8. Left pes, dorsal aspect (x 2½).

a, *b*, *c*, *d*, *e*, } claws of digits in their proper order, *a* being that of the hallux

a, astragalus.

ca, calcaneum.

cu, cuboid.

ic, internal cuneiform.

m, fifth metacarpal.

mc, middle cuneiform.

s, sesamoid bone.

sc, scaphoid.

8a. The fifth metacarpal showing its large hamular expansion, external aspect (x 2½).

8b. Internal view of the large flat tibial sesamoid (x 2½).

9. The skin has been removed from the head and neck, showing the large salivary glands (*nat. size*).

a, meatus auditorius externus.

p, parotid.

s, submaxillary.

sm, tendon of sterno-mastoid.

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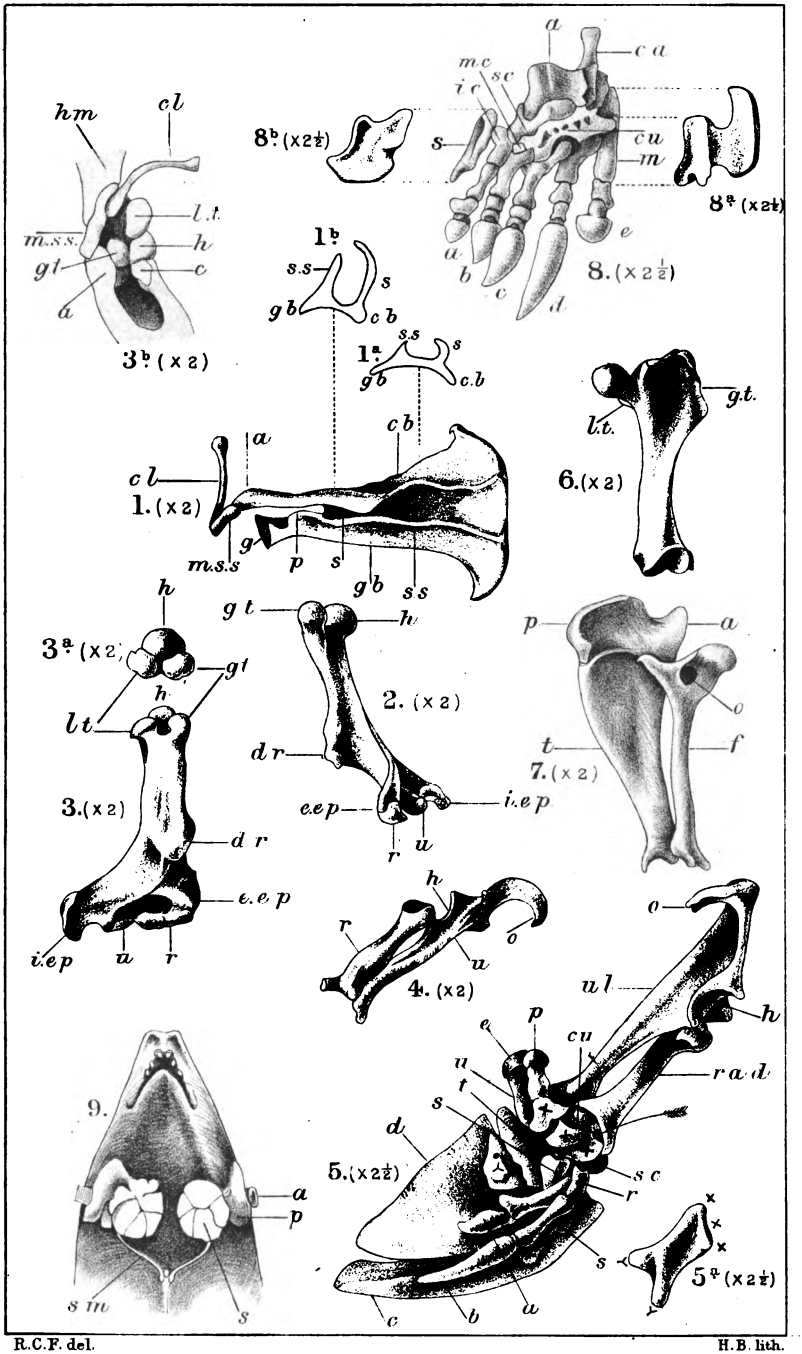

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EXPLANATION OF PLATE IX.

FIGURES.

1. *Notoryctes typhlops.* Sacrum and pelvis, side view (x 2).
   - *ac*, acetabulum.
   - *il*, ilium.
   - *m*, metapophysis of the fourth, or last, lumbar vertebra.
   - *mm*, ankylosed metapophyses.
   - *o*, obturator foramen.
   - *s*, spinous process of third lumbar vertebra.
   - *ss*, spinous processes of first caudal vertebra.
   - *t*, transverse process of first sacral vertebra.
   - *tr*, ankylosed transverse processes of sacral vertebræ.
   - *tt*, transverse process of last lumbar vertebra.

2. Dorsal view of the sacrum and pelvis (x 2).
   - *az*, anterior zygapophyses.
   - *mm*, ankylosed metapophyses.
   - *s*, ankylosed spinous processes. These, meeting the metapophyses on the right side, form a completely closed canal. On the left side the two sets of fused elements do not quite meet, so that the canal is left open.

   The foramina are those of the dorsal division of the spinal nerves.

3. Ventral view of the sacrum and pelvis (x 2).
   - *ac*, acetabulum.
   - *c*, transverse process of second lumbar vertebra.
   - *il*, ilium.
   - *is*, ischium.
   - *pz*, posterior zygapophyses.
   - *sp*, symphysis pubis.

4. Outline of posterior outlet of pelvis (x 2).
   - *mm*, metapophysis.
   - *s*, spinous process.
   - *sp*, symphysis pubis.

5. Urinary and generative organs; (half diagrammatic); ventral aspect *(nat. size)*.
   - *a*, anus.
   - *ad*, adrenal.
   - *ag*, anal gland.
   - *b*, bladder.
   - *ep*, epididymis.
   - *k*, kidney.
   - *p*, penis, the point of which emerges within the cloaca from a preputial sheath formed out of the cloacal wall (vid. fig. 6).
   - *r*, rectum.
   - *t*, testis.
   - *u*, ureter.
   - *ur*, urethra.
   - *vd*, vas deferens.

6. The cloaca has been laid open by a dorsal slit, and the figure shows the point of the penis within it, slightly withdrawn from the sheath formed out of the cloacal wall, in which, ordinarily, it lies almost completely retracted.

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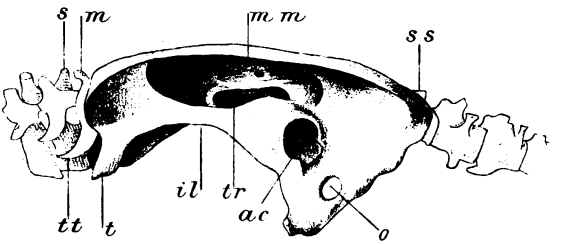

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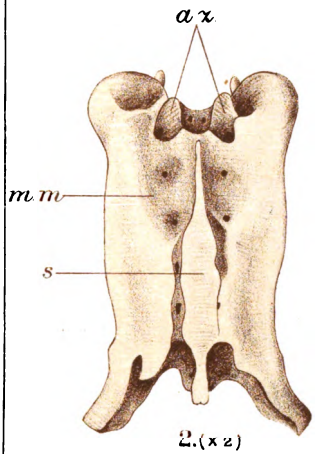

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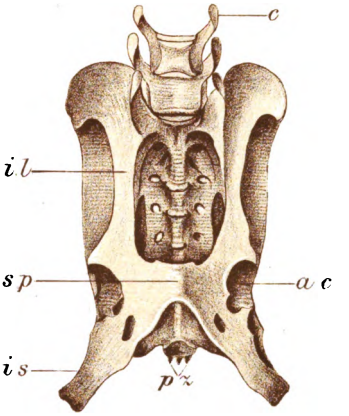

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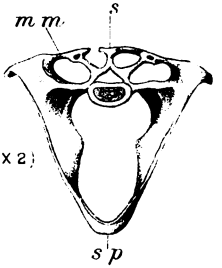

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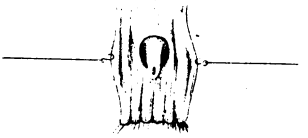

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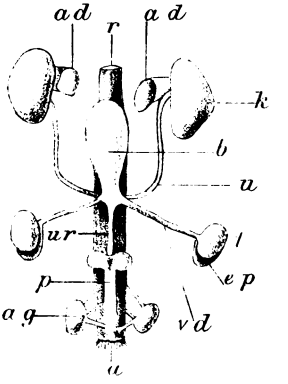

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H.B. lith

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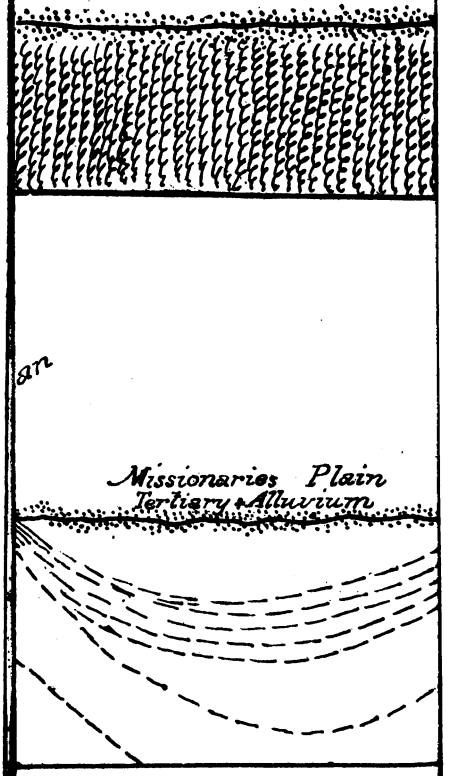

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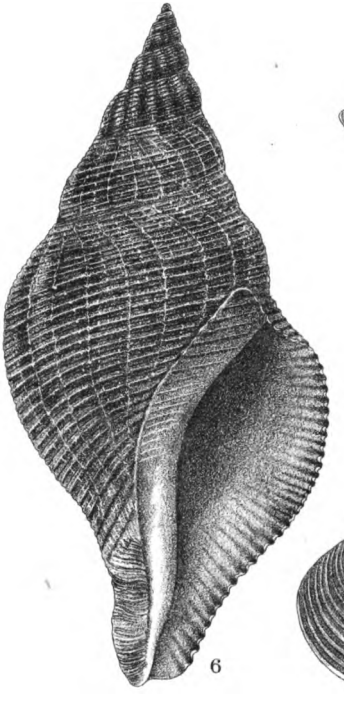

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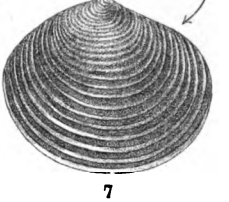

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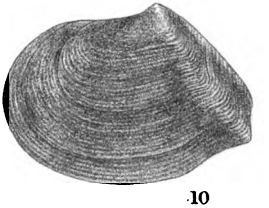

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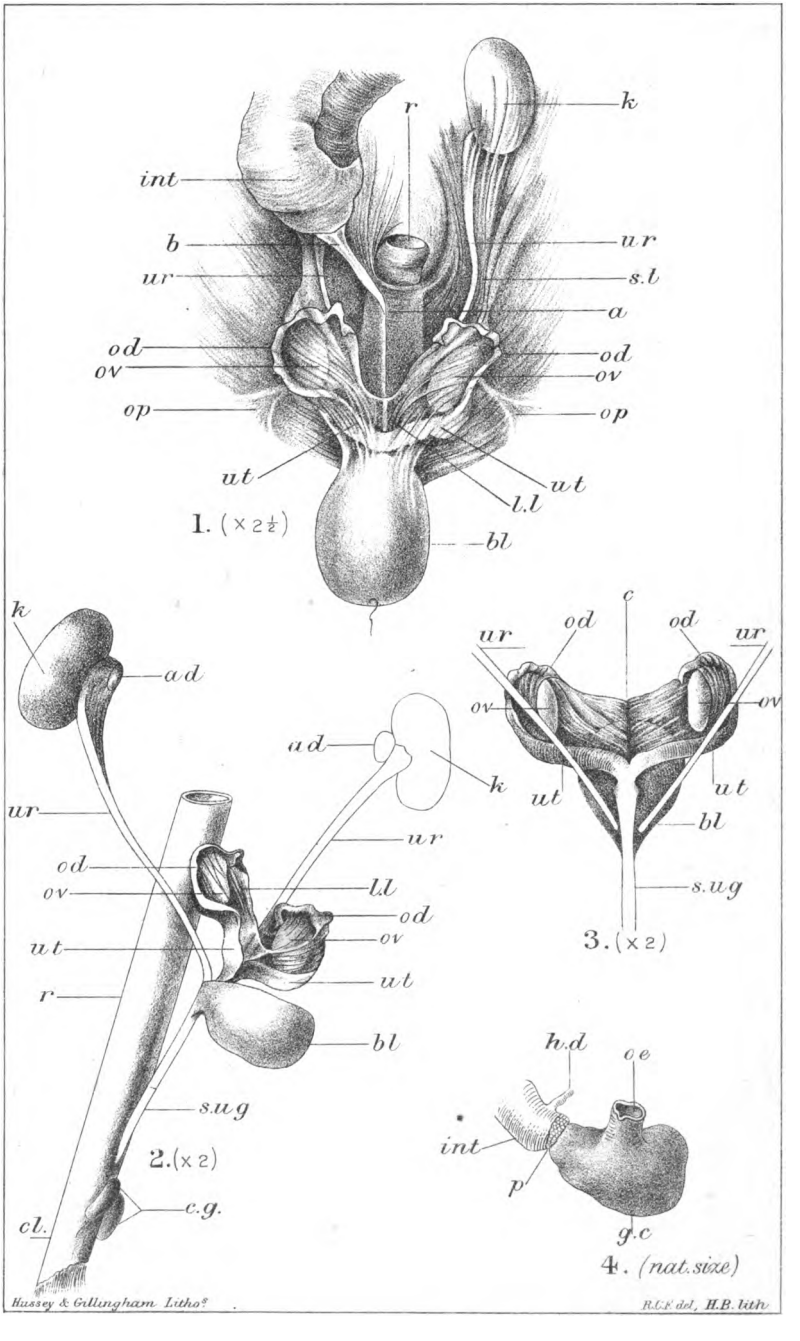

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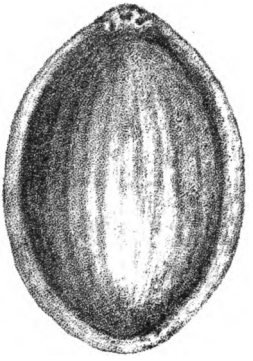
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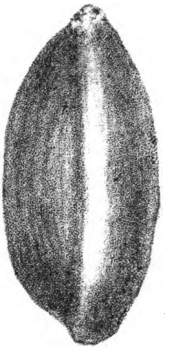
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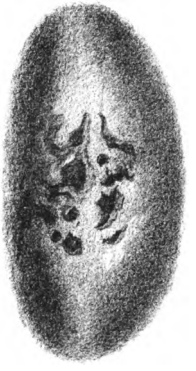
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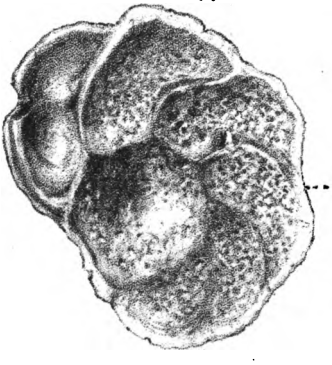
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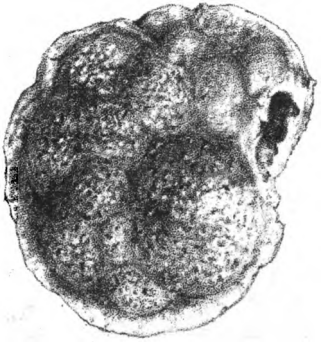
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